COMPARATIVE STUDY OF PATIENTS WITH LONG VS. SHORT HOSPITAL STAY AFTER ELECTIVE LAPAROSCOPIC CHOLECYSTECTOMY

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DECLARATION BY THE CANDIDATE

I hereby declare that the thesis entitled "**COMPARATIVE STUDY OF PATIENTS WITH LONG VS. SHORT HOSPITAL STAY AFTER ELECTIVE LAPAROSCOPIC CHOLECYSTECTOMY"** submitted towards partial fulfillment of the requirements for the award of **MS in GENERAL SURGERY** degree to BFUHS is a compilation of original work carried out by me under the supervision of **Dr. Varun Gupta,** Professor Department of General Surgery, **Dr. Sanjeev K. Singla** Professor, Department of General Surgery. No part of this thesis has formed the basis for the award of any degree previously.

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This thesis is dedicated to my

Father

Mr Sudesh Kumar

Who once saw this dream

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ABBREVIATIONS

ELLC	Elective Laparoscopic Cholecystectomy
LOS	Length Of Stay
DCLC	Day Case Laparoscopic Cholecystectomy
SOJ	Surgical Obstructive Jaundice
CBD	Common Bile Duct
HPB	Hepato Pancreato Biliary
ERCP	Endoscopic Retrograde Pancreatography
CP	Critical Pathway
SPCMCS	Surgical Profitability Compass Procedure Cost Manager and Crimson System
LCBDE	Laparoscopic Common Bile Duct Exploration
SS	Short Stay
LS	Long Stay
PONV	Post Operative Nausea and Vomiting
TLC	Total Leucocyte Count

ABSTRACT

Introduction: Laparoscopic cholecystectomy involves minimally invasive techniques to surgically remove a diseased gallbladder. It offers a safe and efficient procedure for patients with gallstones that minimize postoperative pain leaving no visible scar and transient hospital stay. Laparoscopic cholecystectomy, like all other surgical procedures, carries several risks that can vary from mild to significant and occasionally even life-threatening. Since LC has a continually decreasing length of stay (LOS). It is now generally acknowledged as a suitable and secure ambulatory surgery. It has been observed that implementing standard clinical procedures for LC can successfully lower LOS and improve day-case success.

Aim of Study: The study aimed to identify factors influencing postoperative hospital stay duration following laparoscopic cholecystectomy.

Materials & methods: This prospective observational study was conducted in the Department of Surgery, Dayanand Medical College & Hospital, and Ludhiana involving patients who came to OPD symptomatic gallstone disease in the period from November 2022 to May 2024. Patients were categorized into two groups: Longer Stay (LS) and Short Stay (SS). Long hospital stay was defined as more than 24 hours post-operation. Medical records were used to document and compare 34 variables between the groups. Surgeons performed the laparoscopic cholecystectomies using a standard four-port technique with carbon dioxide insufflation. Statistical analysis was performed using SPSS version 26. Descriptive statistics included range, mean ± standard deviation, and frequencies. Comparisons between groups used paired t-tests and chi-square tests. Statistical significance was set at $p < 0.05$.

Results: The study comprised 62 patients undergoing elective laparoscopic cholecystectomy, equally distributed between short-stay (SS, n=31) and Long Stay (LS, n=31) groups. The analysis of age, laboratory parameters, and pain scores provides valuable insights into the factors potentially influencing the length of stay after laparoscopic cholecystectomy. While age and most laboratory parameters did not show significant differences, serum creatinine levels, intra operative Gallbladder rupture, postoperative pain scores and urinary retention emerged as important factors associated with longer hospital stays.

Conclusion: Our research has revealed a variety of preoperative, intraoperative, and postoperative variables linked to an extended hospital stay after elective laparoscopic cholecystectomy. These results have important implications for surgical technique, hospital administration, and patient care.

Keywords: Laparoscopic cholecystectomy, short hospital stay, long hospital stay, Intraoperative findings, post-operative complications.

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INTRODUCTION

Gallstones also known as Cholelithiasis are masses in the gallbladder that are brought on by unusually high levels of either bilirubin (a by-product of hemolysis) or cholesterol. Any symptoms or difficulties resulting from gallstones in the bile ducts or gallbladder are considered to be indicative of gallstone disease. Individuals who have asymptomatic stones are typically not considered to have gallstone diseases from a clinical perspective. One of the gastrointestinal disorders with the largest socioeconomic costs is gallstone disease.[1]In the early stages, about 75 % of individuals experience no symptoms at all. Gallstone scan cause symptoms like nausea, diarrhoea, anorexia, and epigastric colic as it progresses. Life-threatening illnesses such as acute cholecystitis, biliarypancreatitis, and acute cholangitis can eventually result from gallstone blockage. There are various forms of gallstones, such as pigment, cholesterol, and mixed stones. According to available data, cholesterol stones are present in 90% of cholelithiasis patients.[2]

Acute cholecystitis involves inflammation of the gallbladder usually due to blockage by gallstones. Diagnosis is made on clinical symptoms combined with several diagnostic tests.[3] It is predicted that 12% of people with gallstones may experience symptoms after cholecystitis and 20-40% of people with gallstones may experience related symptoms. Traditionally, supportive care and antibiotics were used to treat cholecystitis, and a cholecystectomy was carried out six weeks following the acute episode.[4] After appendectomy, cholecystectomy is the second-most common gastrointestinal surgery procedure. Carl Langenbuch carried out the first cholecystectomy in Germany on July 15, 1882. Currently, the gold standard treatment is LAPAROSCOPIC CHOLECYSTECTOMY.[5]

Laparoscopic cholecystectomy involves minimally invasive techniques to surgically remove a diseased gallbladder. Since the early 1900s, this method has effectively taken the place of an open method for routine cholecystectomies. Current indications for laparoscopic cholecystectomy

include the management of gallbladder masses/polyps, acalculous cholecystitis, biliary dyskinesia, symptomatic cholelithiasis, and acute/chronic cholecystitis.[6] Elective laparoscopiccholecystectomy (ELLC) is carried out on symptomatic patients who have not been hospitalized or in instances where a biliarycondition has been resolved non-surgically during one or more emergency hospital visits. Surgeons must be aware of the risk variableslinked to unfavorableperi-operative outcomes, such as re-admission, extended post-operative stays, and intra- and postoperative problems, toevaluate a patient'sappropriateness for ELLC. This will be incorporated into the procedure for obtaining informed consent and serve as a guide for the decision to operate.[7]

Laparoscopic Cholecystectomy offers a safe and efficient procedure for patients with gallstones that minimize postoperative pain leaving no visible scar and transient hospital stay. Laparoscopic Cholecystectomy, like all other surgical procedures, carries several risks that can vary from mild to significant and occasionally even life-threatening. During laparoscopiccholecystectomy, common complaints include shoulder tip discomfort, backache, and nausea/vomiting, which are not present during a standard laparotomy.[8]

Length of stay (LOS) is a crucial indicator of how well hospital resources are being used because patients with longer LOSs tend to use more. Hospital beds are used for prolonged lengths of stay, characterized as an inpatient stay longer than anticipated for a particular surgery, adding to the capacity shortage. Additionally, nosocomial infections and unscheduled readmissions are more common in patients with extended length of stay. LOS has been linked to several patient and systemic factors in the range of illness contexts. For example, the patient's demographics and presenting symptoms at admission are common preoperative variables. Research has indicated that LOS is impacted by various parameters including age, functional status, diagnosis, and many more.[9]

Since LC has a continually decreasing length of stay (LOS). It is now generally acknowledged as a suitable and secure ambulatory surgery. It has been observed that implementing standard clinical procedures for LC can successfully lower LOS and improve day-case success. One way to reduce costs without raising the risk of unexpected complications or readmissions is to perform day-case laparoscopic Cholecystectomy or DCLC. In terms of quality of life, going back to work, and engaging in regular activities, it is comparable to an inpatient stay and has a high patient satisfaction rating. To minimize potential exposure to COVID-19, every attempt should be taken to minimize the length of stay (LOS) linked to elective surgery in the current climate.[10]

LOS is a difficult outcome metric that is susceptible to both distorted incentives and financial or organizational incentivizations. Departments, organizations, and health systems define a day case differently; it might be as short as a few hours or as long as 23. It can be challenging to evaluate or internally check the accuracy of LOS reporting.

Some of the components or outcomes of the care pathway regulations may no longer be relevant to modern surgery, even though they may have decreased LOS. A number of smaller individual effects may have combined to have a considerable impact on LOS shortening through care pathway implementation. For instance, certain elements are utilized by the care pathways, such as the use of NSAIDs, the reduction of opiate use, the use of multimodal antiemetics, and the combination of peritoneal and skin local anesthesia. More day cases and a considerable decrease in length of stay (LOS) are likely to result from the implementation of a treatment pathway that includes a variety of perioperative therapies than from any one intervention. Following elective LC, very few therapies alone have an impact on LOS, and when they do, their impact is minimal.[10]

Reducing postoperative hospital stays could benefit more patients if appropriate preoperative preparation and patient selection are made. Individuals with diabetes mellitus ought to be subjected to stringent

perioperative glucose management, and those with low preoperative albumin levels ought to be evaluated for nutritional therapy. Patients with diabetes or advanced age should be aware that they may have a longer postoperative hospital stay. Quitting smoking before the elective laparoscopic cholecystectomy can additionally help to shorten the length of the postoperative hospital stay.[11]

AIMS AND OBJECTIVE

- To evaluate the contributing factors and their relative influence on postoperative length of stay.

REVIEW OF LITERATURE

The gallbladder is an organ in the right upper abdomen region resembling a pear. Its dimensions are roughly 4 cm in width and approximately seven to ten cm in length.[12] It is a component of the biliary system, sometimes called the biliary tract or biliary tree. The pancreas, gallbladder, and liver all have ducts that drain in the small intestine that make up the biliary system. There are two types of components: extrahepatic (found outside the liver) and intrahepatic (found within the liver). Bile is concentrated and stored in the gallbladder, a part of the extrahepatic biliary system.[13]

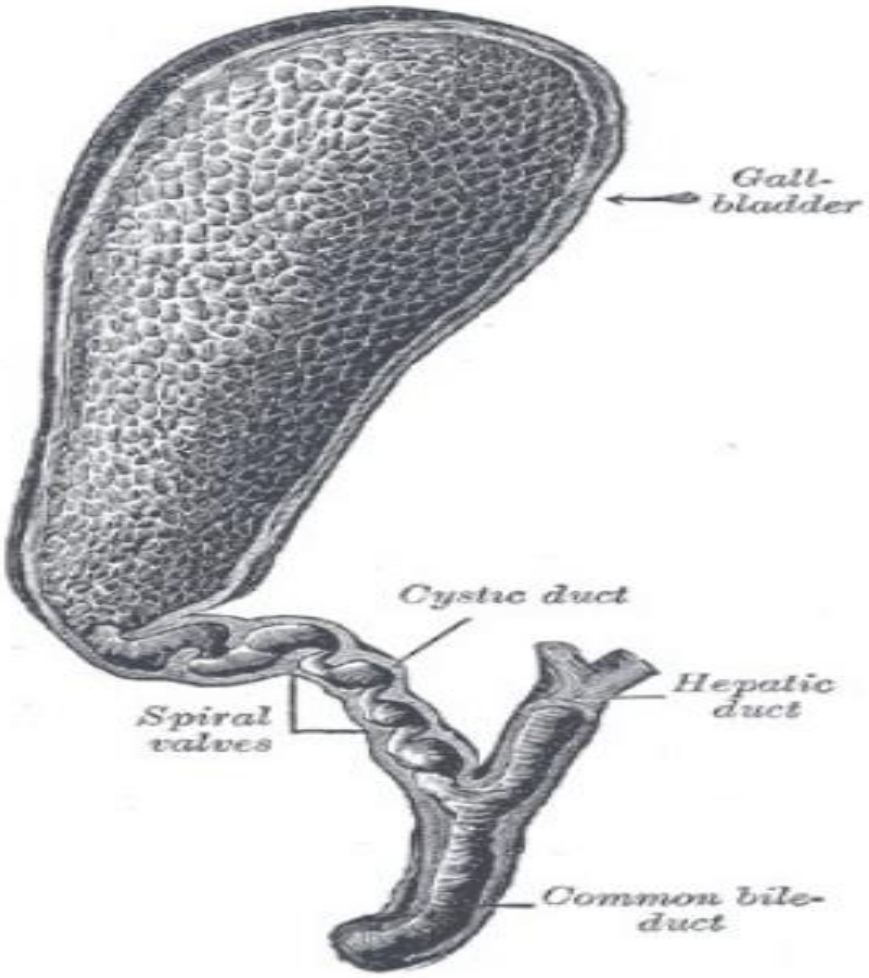


Fig.1: Gallbladder

GROSS ANATOMY

The gallbladder is situated anatomically anteriorly on the lower part of liver sections IV and V. When doing gallbladder and biliary surgery, precise awareness of these anatomic possibilities is essential due to an abundance of variations in the anatomy of the biliary system.

The gallbladder has a peritoneal surface which is inferior and a superior liver surface. It lacks a capsule, but the exposed surface of the gallbladder is covered by an extension of the liver capsule, known as Glisson's capsule.

After widening at its beginning, the gallbladder fundus becomes narrower as it moves further into its main body. The area that connects the neck, cystic duct, and gallbladder body tapers off at the infundibulum. Spiral valves of Heister are located in the distal part of the gallbladder which open into the cystic conduit. By stimulating the brain and hormones, these valves might aid in the emptying of the gallbladder. The gallbladder's infundibulum, or neck, has an inferior outpouching known as Hartmann's Pouch. The top part of the gallbladder fundus occasionally has a paucity. There is no pathological or surgical relevance to what is known as a Phrygian cap.[12]

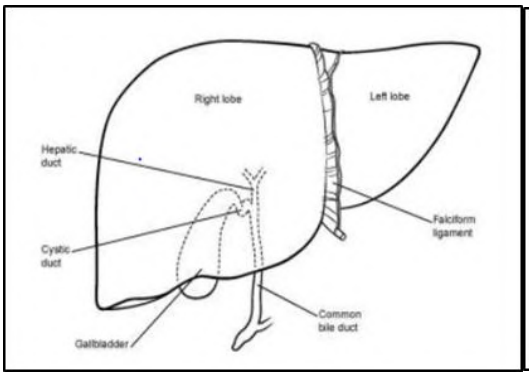


Fig.2: Liver and Gallbladder (Anterior view)

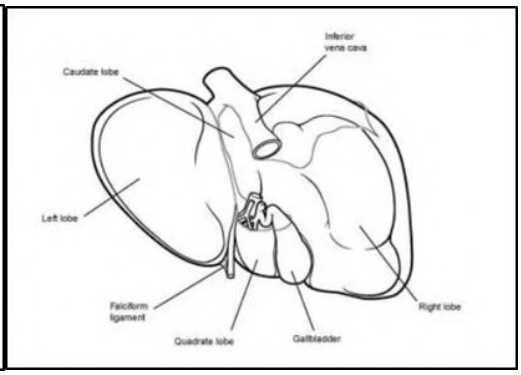


Fig.3: Liver and Gallbladder (Posterior view)

MICROSCOPIC ANATOMY

The mucosa of the gallbladder wall is made up of columnar epithelium that secretes mucus (not bile, which is produced in the liver and only stored

and concentrated in the gallbladder); other components include the muscularis propria (crisscrossing muscles), connective tissue called subserosa, tunica propria (lamina), and serosa.

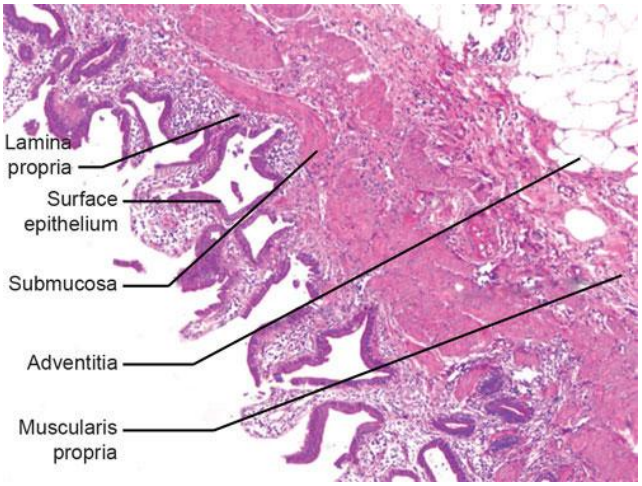


Fig.4: Histological section of gallbladder

The submucosa of the gallbladder is absent. The gallbladder resembles a honeycomb due to its numerous polygonal compartments on its inner mucosal surface. The mucosal outpouchings known as Rokitansky-Aschoff sinuses penetrate the muscularis propria and enter the perimuscular/subserosal tissue.

Mucosal spiral folds, known as Heister valves, are present in the cystic duct. The submucosal sphincter of Boyden located around the lower end of the common bile duct, or CBD, is the only muscle layer present in the fibroelastic wall of the bile duct. The mucus secreted by the columnar epithelium lining the CBD is the "white" bile that is present among individuals with surgical obstructive jaundice (SOJ).[14]

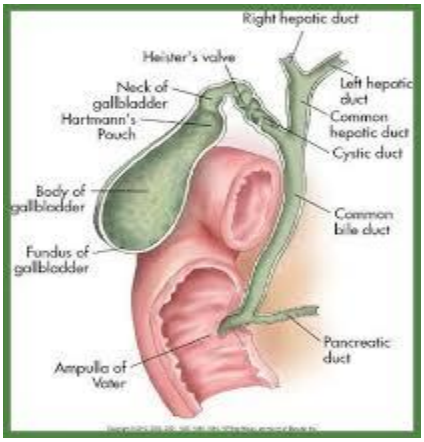


Fig.5: Biliary system

PHYSIOLOGIC ANATOMY

The gallbladder acts as a reservoir as its size increases or decreases depending on the amount of volume of mucus or bile.The typical gallbladder has a volume of 30 to 50 mL; however, it can expand up to several times the amount it normally holds when obstructed. A blockage at the lower end of the CBD, such as that caused by pancreatic cancer, causes the gallbladder to swell with bile; if the cystic passageway is obstructed by a stone, the gallbladder swells with mucus (not bile) and is referred to as mucocele.[14]

EMBRYOLOGY

The hepatic diverticulum emerges from the forming duodenum in pouches toward the completion of the fourth week. A second outpouching, the cystic diverticulum, forms the gallbladder right below the hepatic diverticulum, which eventually becomes the biliary tree. Human biliary tree development is incredibly varied, resulting in a wide range of biliary system variances.[12]

SURGICAL CONSIDERATIONS

The following limits define the triangle of Calot, which is important for surgery:

1) the cystic duct on the right,

2) the common hepatic duct on the left

3) the superior liver surfaces

In 1891the original definition of triangle included cystic duct, common hepatic duct, and the cystic arteries as the outer boundaries. After this, improvements have been made to modify for better identification of landmarks for cystic artery locations. A surgically significant feature is that the cystic artery and lymph node are included in the contemporary definition of the Calot triangle.[12]

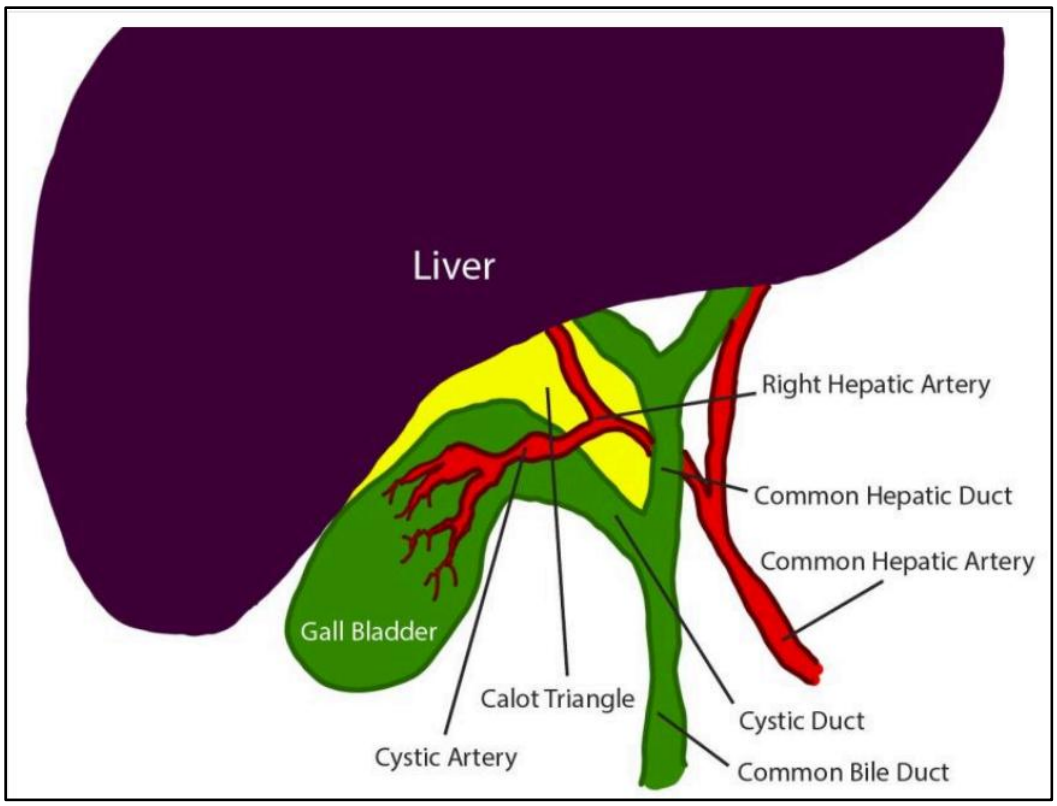


Fig.6: Calot's Triangle

PATHOPHYSIOLOGY

Cholelithiasis

Gallstones, also known as cholelithiasis, are lumps in the biliary system or gallbladder that result from unusually high bile content of mainly cholesterol or bilirubin, a byproduct of hemolysis. Around 10% to 20% of adults have gallstones, and more than 20% of those who have them will eventually experience symptoms like biliary colic or infections, usually in adulthood. The presence of symptoms or issues brought on by gallstones within the bile ducts or gallbladder is what is known as gallstone disease.[1]

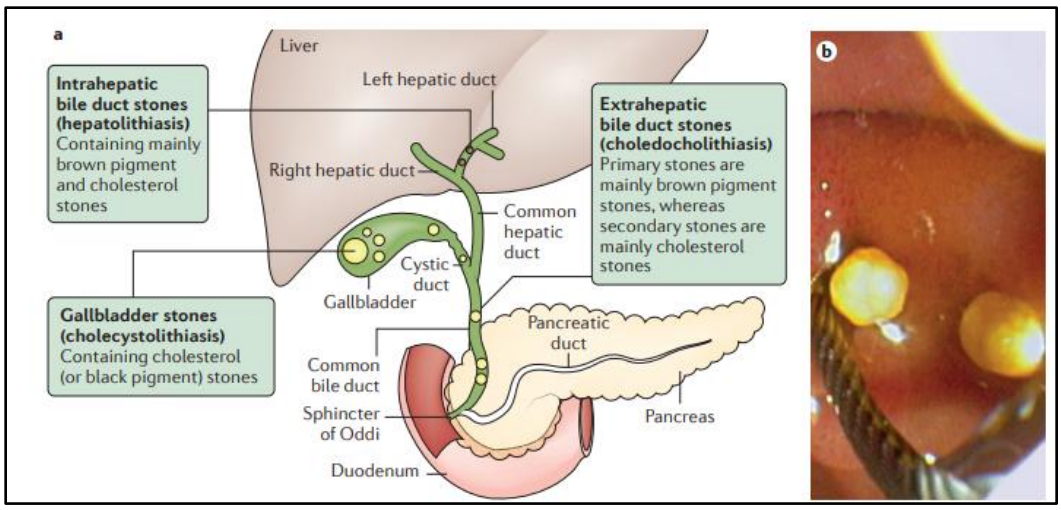

a
Liver
Left hepatic duct
Intrahepatic bile duct stones (hepatolithiasis) Containing mainly brown pigment and cholesterol stones
Right hepatic duct
Extrahepatic bile duct stones (choledocholithiasis) Primary stones are mainly brown pigment stones, whereas secondary stones are mainly cholesterol stones
Common hepatic duct
Cystic duct
Gallbladder
Gallbladder stones (cholecystolithiasis) Containing cholesterol (or black pigment) stones
Pancreatic duct
Common bile duct
Sphincter of Oddi
Pancreas
Duodenum
b

Fig.7: Classification of gallstones. A) Potential localization of gallstones in the biliary tree are illustrated. Different colours of the stones represent composition, including cholesterol stones(yellow) and pigment stones (brown and black). B) endoscopic view of secondary cholesterol stones (with a typical yellow color) in the bile duct during stone retrieval with a Dormia basket.

Based on the predominant chemical content, gallstones can be divided into two basic categories: **pigment** or **cholesterol**.

Cholesterol gallstones: Gallstones made with cholesterol makes up about 75% of gallstones. Previously, it was believed that bile stasis, gallbladder inflammation, and the uptake of bile salts from injured mucosa were the causes of this kind of stone.

Pigment gallstones:Ten to fifteen percent of gallstones are pigmented black. They result from excessive saturation of bile with calcium hydrogen bilirubinate, deposition of calcium carbonate, phosphate, and mineral salts, and persistent hemolysis.[15]

Location	Type	Main chemical composition	Morphology
Gallbladder	Pure cholesterol stones	>95% cholesterol by weight	Light yellow, hard and spherical with a smooth or morular surface
	Black pigment stones	Polymerized calcium bilirubinate	Black, soft and fragile, and small sphere with a smooth surface
Common bile duct	Mixed cholesterol stones	>50% cholesterol by weight plus calcium bilirubinate	Light yellow to brown, hard and spherical with a smooth surface
Intrahepatic bile duct	Brown pigment stones	Monomeric calcium bilirubinate	Brown, soft, fragile to hard and spherical with a multifaceted surface

Table1: Location and composition of gallstones

Biliary colic

The dull, severe abdominal pain that a patient experiences when a gallstone or biliary sludge lodges in the cystic duct is known as biliary colic. The gallbladder wall is subsequently stretched, and the intraluminal pressure rises as a result of intermittent contraction of the gallbladder against a clogged cystic duct.[16]

Ascending cholangitis

An infection in a bile duct that is partially or blocked causes ascending cholangitis. The bacterial flora in the area grows while there is stasis. If there is a chance that the clogged biliary system will get infected again, as might happen during endoscopic retrograde cholangiopancreatography, then the risk is elevated. Charcot's triad is diagnostic, consisting of fever (sometimes with rigors), jaundice, and pain in the right upper quadrant.[17]

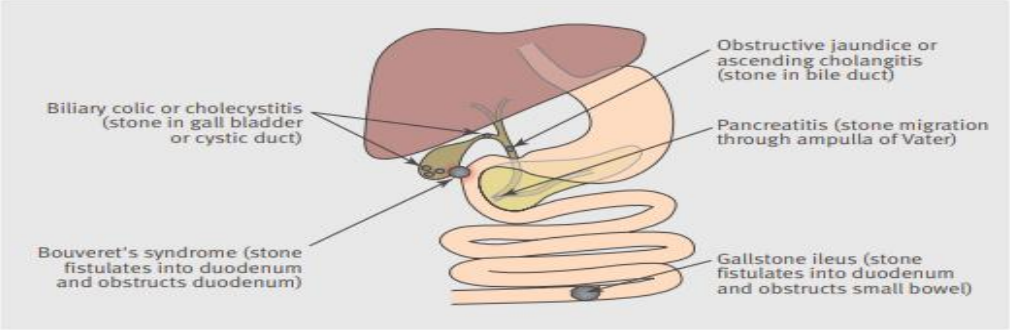

Biliary colic or cholecystitis (stone in gall bladder or cystic duct)
Obstructive jaundice or ascending cholangitis (stone in bile duct)
Pancreatitis (stone migration through ampulla of Vater)
Bouveret's syndrome (stone fistulates into duodenum and obstructs duodenum)
Gallstone ileus (stone fistulates into duodenum and obstructs small bowel)

Fig.8: Problems caused by gallstones

Bouveret’s syndrome and gallstone ileus

During a phase of frequently quiet inflammation, gallstones may fistulate straight from the gallbladder into the duodenum. Bouveret's syndrome, or duodenal blockage, can result from a stone impacting the duodenum. A

Meckel's diverticulum is the remnant of the embryological vitello-intestinal duct that originally existed in the terminal ileum. Alternatively, it can affect the narrowest portion of healthy small bowel. This results in a condition called gallstone ileus, which is a mechanical small bowel obstruction rather than an ileus.[17]

EVALUATION

Urine analysis, total bilirubin, lipase, amylase, Alk Phos, CMP, PT/PTT, and CBC are frequently the first lab tests used to assess gallstones. The most effective imaging modality for diagnosing gallstones is still ultrasound. Further diagnostic procedures that are typically acquired following an ultrasound include endoscopic or magnetic retrograde cholangiopancreatography (ERCP/MRCP), which can be helpful in the evaluation of patients exhibiting jaundice, dilated CBD, or suspected cholangitis. With the added benefit of enabling intervention (such as stenting, stone extraction, or biopsy) if pathology is discovered, ERCP is an invasive technique that calls for the use of contrast dye. Conversely, MRCP doesn't involve the use of contrast material and is noninvasive.[18]

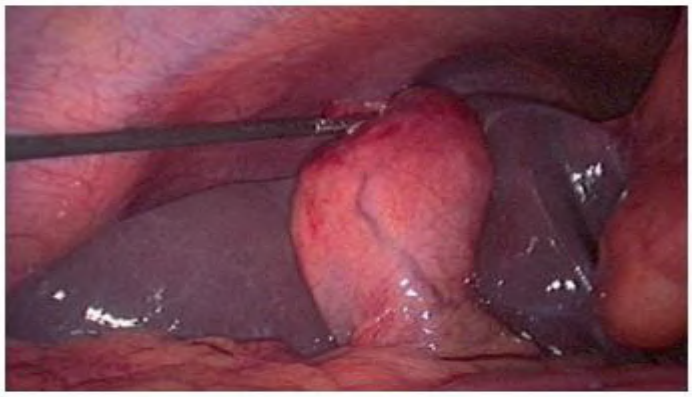


Fig.9: Laparoscopic picture

TREATMENT / MANAGEMENT

Management of gallstones can be divided into two categories: **asymptomatic gallstones** and **symptomatic gallstones**.

- **Asymptomatic gallstones**– counselling the patient about biliary colic.

- **Cholelithiasis without complications** can be immediately treated, after making final diagnosis with parenteral or oral analgesics.
- The most common procedure is laparoscopic cholecystectomy, and most patients are treated as outpatients.
- **Acute cholecystitis**–patients having symptoms will need an IV antibiotic, a surgical consult and hospital admission.
- **Choledocholithiasis or gallstone pancreatitis**- ERCP or MRCP, gastrointestinal (GI) evaluation, and hospital admission.[18]

Rehman FU., et al.in 2024 evaluated the postoperative complications, nursing care, stay of hospital amongst the high-risk older individuals who has to receive early elective laparoscopic cholecystectomy versus tube cholecystostomy for acute cholecystitis. Total of 70 patients were selected in this cross-sectional study from which half of them went for tube cholecystostomy and others went for early elective laparoscopic cholecystectomy within 72 hours of admission.Ninety-one percent of patients in Group 1 and eleven percent of patients in Group 2 had hospital stays shorter than five days (p=0.000).[19]

Gill AS., et al in 2021 did a comparative study on early and delayed cholecystectomy. By lottery, two groups of forty-four patients, with complaints of acute cholecystitis, ranging in age from twenty to sixty years, were selected. Laparoscopic cholecystectomy was performed early on in group A, and it was performed later in group B. Factors like the duration of the procedure, the switch to an open cholecystectomy, adhesions, damage to the biliary tract, wound infection, and length of hospital stay were noted.[4]

Ryan JM., et al reviewed an article in 2020 which stated that day case rates and LOS were found to be significantly impacted by the deployment of care pathways. It was also observed that smaller, independent actions had a limited impact. A deeper comprehension of the components of a care route that work well and the local implementation obstacles that need to be addressed is necessary to meet ideal day-case targets.[10]

Chong JU., et al in 2016 retrospectively analysed 336 patients who were to undergo laparoscopic cholecystectomy in 8 hospitals and then randomized into 2 groups according to postoperative stay and evaluation of perioperative and patient factors were done.The factors that affected the length of hospital stay following a laparoscopic cholecystectomy were operation time, emergency procedure, patient age, and smoking. These factors ought to be the main targets of hospital stay reduction initiatives.[11]

WasanaKo-iam et al did a study in 2016 which aimed to identify the causes of a long hospital stay after LC. 500 satisfactory elective LC patients were incorporated in the analysis of this retrospective cohort research. A short-term hospital stay was described as leaving the hospital within 24 hours of the procedure, whereas a prolonged hospital stay was characterized as needing to stay more than 24 hours following the procedure. A lengthy hospital stay was significantly predicted by LC issues in addition to pharmaceutical and surgical variables.[20]

Lee SY., et al did a retrospective cross-sectional study from January 2014 to January 2015 at a Singaporean 1250-bed tertiary academic hospital. The study included all elective the Health Promotion Board and NS patients over the age of 18, except for day and emergency procedures, which resulted in 150 and 166 patients, respectively. The term "prolonged LOS" referred to a surgical operation that was more complex than the median length of time. The results showed that preoperative variables were more closely related to extended length of stay (LOS) for HPB.[9]

Hobbs MS., et alassessed the effect on hospital utilization of laparoscopic cholecystectomy (LC) and related endoscopic retrograde pancreatography (ERCP). They studied the whole population of Western Australia who had a cholecystectomy between 1980 and 2000 using a population-based approach. Pre- and postoperative hospitalizations were identified using record linkage, and the total duration of stay for each instance was estimated using all pertinent admissions. The average aggregate duration of stay per case, the percentage of cases with relevant pre- and

postoperative hospital admissions, the rates of cholecystectomy, and the total number of beds used per population unit were all estimated. Pre- and postoperative admission increased somewhat offset the decreased hospital utilization linked to LCand a persistent rise in the number of cholecystectomy cases.[21]

Park JW et al in 2018 did a retrospective study which analysed timely hospital discharge following laparoscopic cholecystectomy between Day 1 and Day 2 postoperative discharge. Two groups of patients were formed: 38 patients were placed in the 1 day CP group and 33 patients in 2 day CP group and hospital cost and surgical outcomes were recorded. Compared to 1-day CP, the 2-day CP had longer operating times. 1- day CP group's hospital stay was shorter than the 2-day CP groups.[23]

Kapoor T et al in 2018; conducted a cohort study that included 12 surgeons from three subspecialities – general surgery, acute care surgery and bariatric surgery captured 372 laparoscopic patients that were done between June 2015 and June 2016. The study stratified case volume, supply cost, case duration, case severity level, and patient length of stay using SPCMCS. Shorter hospital stays for patients could offset the increased supply expenses.[24]

Doke A et al in 2016 aimed to compare the differences between laparoscopic and conventional cholecystectomy in terms of process length, side effects, pain following surgery, need for analgesics, and length of hospital stay. The approach involved randomly assigning 50 patients under 70 years old who had calculous cholecystitis but no evidence of CBD stones to either open or laparoscopic cholecystectomy. The primary benefits of LC included quicker recovery, shorter hospital stays, earlier return to work, and less postoperative pain requiring the use of analgesics.[25]

Zhu B et al in 2015 sought to access if LCBDE had an impact on patients' clinical outcomes within or after 72 hours of emergency admission. The two groups were compared with respect to various parameters of which

one was length of stay. Stones were extracted by choledochoscopy from 3 and 5 patients in the early and delayed groups, respectively before the T-tube was withdrawn. Three patients in each group experienced biliary leaks, which were treated conservatively with drainage. The early group had shorter LOS and lower total cost than the late group. With a shorter LOS and lower cost, early LCBDE may be preferable to delayed procedures.[26]

Ivatury SJet al in 2011 analyzed data from a community health system with five hospitals regarding patients have laparoscopic cholecystectomy. Post operative duration of stay was significantly influenced by several parameters, most important of which were ASA class and non-elective status. Reduced hospital use may be a benefit of optimizing the delivery of elective care for individuals with symptomatic gallbladder disease.[27]

Higgins A., et al did a prospective double blind randomized trial in which 450 patients who were to undergo Elective LC were divided into 3 groups. One-gram IV cefotetan disodium, one gram IV cefazolin, and a placebo IV were administered to the first and third groups, respectively. Three incidences of superficial infections at the surgical site, one case of pneumonia, and one case of rhinosinusitis were observed in the cefotetan group. Two superficial surgery site infections and one urinary tract infection were observed in the placebo group. The data indicated that the rate of wound infections following elective laparoscopic cholecystectomy is not reduced by the use of prophylactic antibiotics.[22]

MATERIAL & METHODS

Data Source

This prospective observational study was conducted in the General Surgery Department at Dayanand Medical College and Hospital in Ludhiana, Punjab, India. The study included 62 patients who presented to the Surgery Department's outpatient clinic with symptomatic gallstone disease.

Data Collection

Method Patients were categorized into two groups: Longer Stay (LS) and Short Stay (SS). Long hospital stay was defined as more than 24 hours post-operation. Medical records were used to document and compare 34 variables between the groups, including:

- 6 patient variables (age, sex, chief complaint, per abdomen findings, blood parameters, post operative vas score)
- 4 abdominal ultrasound parameters (calculi count, gallbladder wall thickness, pericholecystuc fluid, CBD diameter)
- 6 intra-operative variables (empyema, adhesion, gallbladder wall status, dissection of Calot’s, other findings)
- 8 intra-operative complication variables (gallbladder rupture, CBD injury, gallbladder bed hemorrhage, cystic artery hemorrhage, CBD injury, duodenal injury, other organ injury, stone spillage, other complications)
- 10 post-operative complication variables (bile leak, surgical site infection, port site hemorrhage, CBD injury, paralytic ileus, abdominal distension, nause/vomiting, icterus, urinary retention, shoulder pain)

Patient information collected included demographics such as their name, age, gender, occupation, religion, socioeconomic status together with detailed medical history special focusing on right upper quadrant or epigastric pain it’s periodicity, any relation with fatty meals and relief by oral or parenteral medication. A routine general physical examination and systemic examination were performed. Pre-operative workup involved

routine lab tests, chest X-ray, and abdominal ultrasound to confirm cholelithiasis diagnosis, and assess gallbladder condition, gallbladder wall thickness, pericholecystic collection, choledocholithiasis, and CBD dilatation.

All patients underwent pre-anaesthetic evaluation and provided informed consent, including the risk of conversion to open cholecystectomy. Nasogastric tubes were placed for gastric decompression, and prophylactic antibiotics (Inj. Cefuroxime 1.5 gm IV) were administered pre-operatively.

Surgical Procedure

Senior surgeons performed the laparoscopic cholecystectomies using a standard four-port technique with carbon dioxide insufflation. Pneumoperitoneum was achieved using the Veress technique. The cystic artery and duct were isolated and secured with metallic clips separately. In some cases, a suction drain was placed. Patients began oral intake on the third post-operative day, progressing from liquids to solids, provided they didn't experience nausea or vomiting.

Participant Selection

Inclusion Criteria:

- Adults (18+ years) undergoing elective laparoscopic cholecystectomy
- Ultrasound findings showing:
    1. Gallbladder stones
    2. Thickened gallbladder wall
    3. Oedematous gallbladder wall
    4. Peri-cholecystic fluid collection

Exclusion Criteria:

- Minors (under 18 years)
- Gallbladder malignancy
- Choledocholithiasis
- Perforated gallbladder

- Pregnancy
- Unsuitable for general anesthesia
- Previous upper abdominal surgery
- CBD dilation >10mm
- Prior CBD exploration
- Pancreatitis
- Jaundice or abnormal liver function tests
- Refusal to provide consent

Sample Size Determination

The sample size was calculated based on a previous study comparing acute inflammation rates between short-stay (SS) and longer-stay (LS) groups. Using a statistical formula accounting for effect size, significance level (5%), and desired power (80%), the required sample size was determined to be 28 per group. This was increased to 31 per group (total 62) to account for potential dropouts.

By using a previous study (reference), the Acute inflammation is 10.7% in group SS and 42.3% in group LS

Based on this assumption

The **formula** used in the situation is as under:

$n = [Z\ 1-\alpha/2\ \sqrt{2}\ P\ (1-P) + Z\ 1-\beta\ .\sqrt{\{P1(1-P1) + P2\ (1-P2)\}}]2$

$(P1-P2)\ 2$

Where $P=(P1+P2)/2$

* Approximate value of efficacy/cure rate for standard treatment =P1
* Approximate value of efficacy/cure rate for other treatment = P2
* Effect size = (P2-P1)
* Level of significance (usually 5%)
* $Z\alpha$ = Value of standard normal variate corresponding to α level of significance (1.96)
· $Z\beta$ = The standard normal deviate for desired power(0.842)

Study Objective

The primary outcome was to identify factors influencing post-operative hospital stay duration following laparoscopic cholecystectomy.

Data Analysis

Statistical analysis was performed using SPSS version 26. Descriptive statistics included range, mean ± standard deviation, and frequencies. Comparisons between groups used paired t-tests and chi-square tests. Statistical significance was set at $p < 0.05$.

OBSERVATION AND RESULTS

1. Demographic Characteristics

1.1 Age Distribution

The study comprised 62 patients undergoing elective laparoscopic cholecystectomy, equally distributed between Short Stay (SS, n=31) and Long Stay (LS, n=31) groups. Analysis of age demographics revealed a mean age of 44.07 ± 16.15 years in the SS group, compared to 51.23 ± 13.25 years in the LS group. While this difference suggested a trend towards older patients in the LS group, it did not reach statistical significance (Z=-1.92, p=0.055).

Further stratification of age groups demonstrated varied distributions between SS and LS cohorts (Table 2, Figure 10). Notably, the SS group had a higher proportion of patients under 30 years (25.8% vs 6.5%), while the LS group showed a greater percentage of patients over 60 years (29.0% vs 19.4%). The age group 41-50 years was equally represented in both groups (22.6%), while the 51-60 years age group was more prevalent in the LS group (22.6% vs 9.7% in SS group).

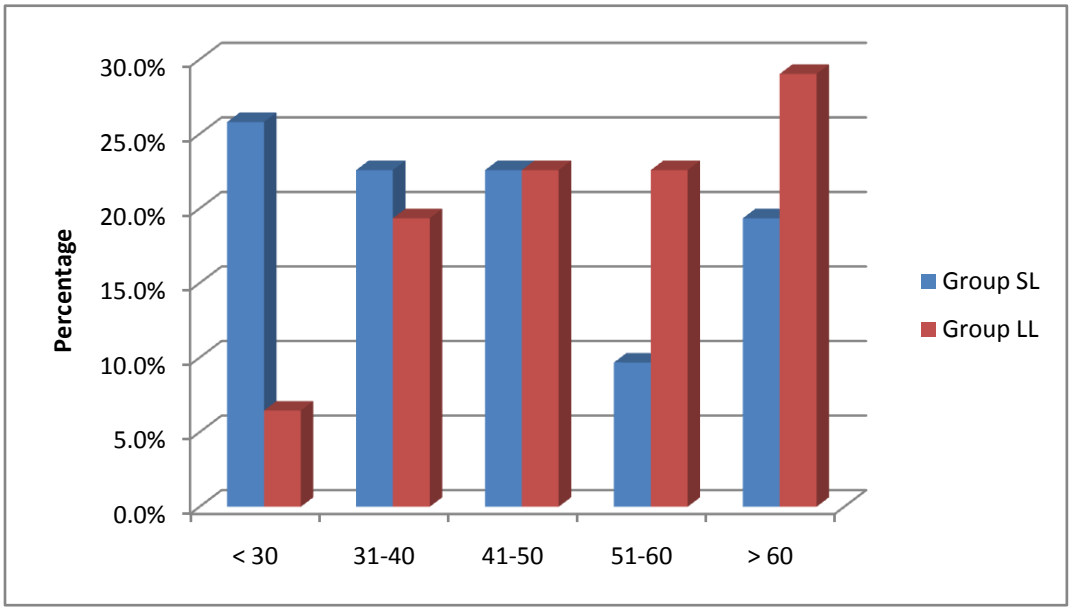
Table 2: Age Distribution across Short Stay and Long Stay Groups

Age Group	SS Group (n, %)	LS Group (n, %)	Total (n, %)
< 30	8 (25.8%)	2 (6.5%)	10 (16.1%)
31-40	7 (22.6%)	6 (19.4%)	13 (21.0%)
41-50	7 (22.6%)	7 (22.6%)	14 (22.6%)
51-60	3 (9.7%)	7 (22.6%)	10 (16.1%)
> 60	6 (19.4%)	9 (29.0%)	15 (24.2%)

Despite these observed variations, chi-square analysis did not indicate a statistically significant difference in overall age distribution between the groups (χ^2=5.877, p=0.209). This suggests that while there is a trend

towards longer hospital stays in older patients, age alone may not be a definitive predictor of postoperative length of stay.

The age distribution pattern observed in this study aligns with the general understanding that gallbladder disease becomes more prevalent with increasing age. The higher proportion of younger patients in the SS group and older patients in the LS group may reflect the impact of age-related factors such as comorbidities, reduced physiological reserves, and potentially more complex gallbladder pathology in older individuals, which could contribute to longer recovery times and hospital stays



[Figure 10: Bar graph depicting age distribution across SS and LS groups]

1.2 Gender Distribution

Examination of gender demographics revealed a predominance of female patients in both groups, consistent with the known epidemiology of gallbladder disease (Table 3, Figure 11). In the SS group, 58.1% (n=18) were female and 41.9% (n=13) were male. The LS group exhibited a slightly higher female preponderance with 67.7% (n=21) females and 32.3% (n=10) males.

Table 3: Gender Distribution in Short Stay and Long Stay Groups

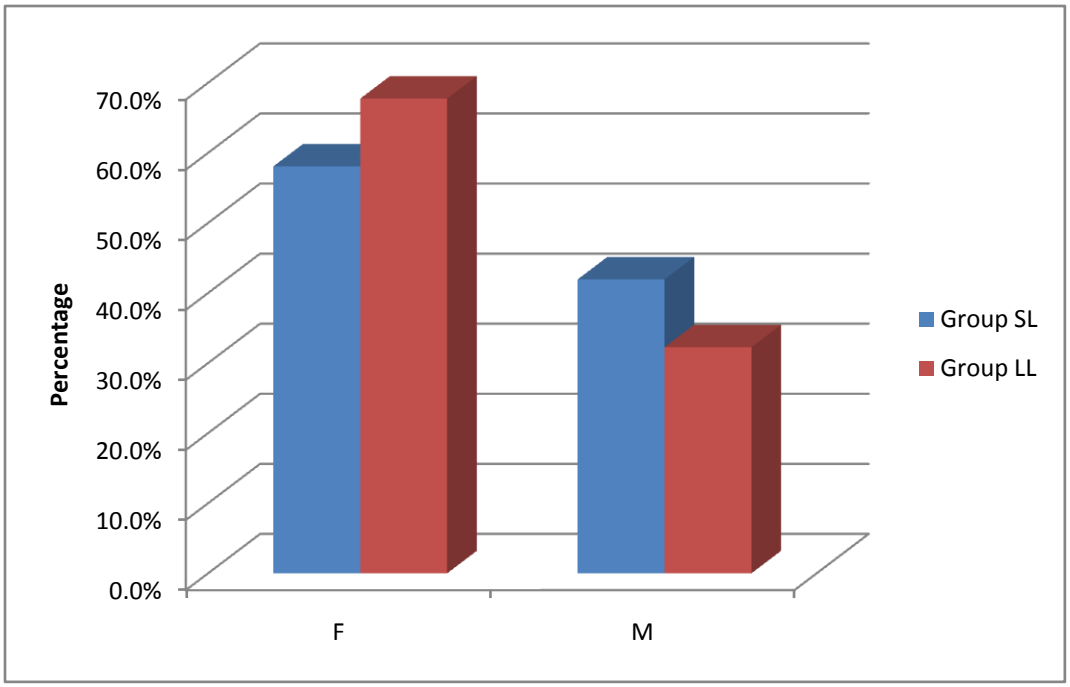
Gender	SS Group (n, %)	LS Group (n, %)	Total (n, %)
Female	18 (58.1%)	21 (67.7%)	39 (62.9%)
Male	13 (41.9%)	10 (32.3%)	23 (37.1%)

Statistical analysis using chi-square test did not demonstrate a significant difference in gender distribution between the two groups (χ^2=0.622, p=0.430). This finding suggests that gender may not be a determining factor in the length of hospital stay following laparoscopic cholecystectomy.

The overall female predominance (62.9% of total patients) aligns with established literature indicating a higher prevalence of gallbladder disease in women. Factors contributing to this gender disparity may include hormonal influences, particularly estrogen, which is known to increase cholesterol saturation in bile. Additionally, pregnancy and oral contraceptive use, which are unique to females, are recognized risk factors for gallstone formation.

Interestingly, while not statistically significant, the slightly higher proportion of females in the LS group (67.7% vs 58.1% in SS group) warrants further investigation. This trend could potentially be attributed to factors such as a higher likelihood of complicated gallbladder disease in women, or gender-specific differences in pain perception and postoperative recovery. However, these hypotheses would require further study with a larger sample size to confirm or refute.

The lack of statistically significant difference in gender distribution between SS and LS groups suggests that other factors, such as the severity of gallbladder disease, comorbidities, or intraoperative findings, may play a more crucial role in determining the length of hospital stay than gender alone.



[Fig. 11: Bar graph illustrating gender distribution in SS and LS groups]

In conclusion, while age and gender are important demographic factors in gallbladder disease, their direct influence on the length of hospital stay following laparoscopic cholecystectomy appears to be limited in this study cohort. These findings underscore the complexity of factors determining postoperative recovery and highlight the need for a multifaceted approach in predicting and managing hospital stay duration following laparoscopic cholecystectomy.

2. Clinical Presentation

2.1 Diagnosis

The study analyzed various gallbladder pathologies across both Short Stay (SS) and Long Stay (LS) groups. A diverse range of diagnoses was observed, reflecting the spectrum of gallbladder diseases encountered in clinical practice (Table 4, Figure 12).

Table 4: Distribution of Diagnoses in Short Stay and Long Stay Groups

Diagnosis	SS Group (n, %)	LS Group (n, %)	Total (n, %)
Symptomatic gall stone disease	14 (45.2%)	16 (51.6%)	30 (48.4%)
Cholelithiasis	12 (38.7%)	5 (16.1%)	17 (27.4%)
Acute calculus cholecystitis	3 (9.7%)	6 (19.4%)	9 (14.5%)
Acute gangrenous complicated cholecystitis	0 (0.0%)	1 (3.2%)	1 (1.6%)
Chronic calculus cholecystitis	0 (0.0%)	1 (3.2%)	1 (1.6%)
Empyema gall bladder with gall bladder stone	0 (0.0%)	1 (3.2%)	1 (1.6%)
Gb polyp with cholelithiasis	1 (3.2%)	0 (0.0%)	1 (1.6%)
Mucocele GB	0 (0.0%)	1 (3.2%)	1 (1.6%)
Xanthogranulomatous cholecystitis	1 (3.2%)	0 (0.0%)	1 (1.6%)

Symptomatic gallstone disease emerged as the predominant diagnosis in both groups, accounting for 45.2% (n=14) of cases in the SS group and 51.6% (n=16) in the LS group. This was followed by cholelithiasis, which was more prevalent in the SS group (38.7%, n=12) compared to the LS group (16.1%, n=5).

Acute calculous cholecystitis was the third most common diagnosis overall, with a notably higher incidence in the LS group (19.4%, n=6) compared to the SS group (9.7%, n=3). This difference suggests a potential association between acute inflammation and prolonged hospital stay.

Several less common diagnoses were observed, each accounting for 3.2% (n=1) of cases in either the SS or LS group. These included acute gangrenous complicated cholecystitis, chronic calculus cholecystitis, empyema of the gallbladder with gallbladder stone, gallbladder polyp with

cholelithiasis, mucocele of the gallbladder, and xanthogranulomatous cholecystitis.

Interestingly, some diagnoses were exclusively found in one group. For instance, acute gangrenous complicated cholecystitis, chronic calculus cholecystitis, empyema, and mucocele were only observed in the LS group, while gallbladder polyp with cholelithiasis and xanthogranulomatous cholecystitis were only seen in the SS group.

Despite these observed variations in the distribution of diagnoses between the SS and LS groups, chi-square analysis did not demonstrate a statistically significant difference in the overall distribution (χ^2=11.307, p=0.418). This finding suggests that while certain diagnoses may be more prevalent in one group, the preoperative diagnosis alone may not be a reliable predictor of postoperative length of stay.

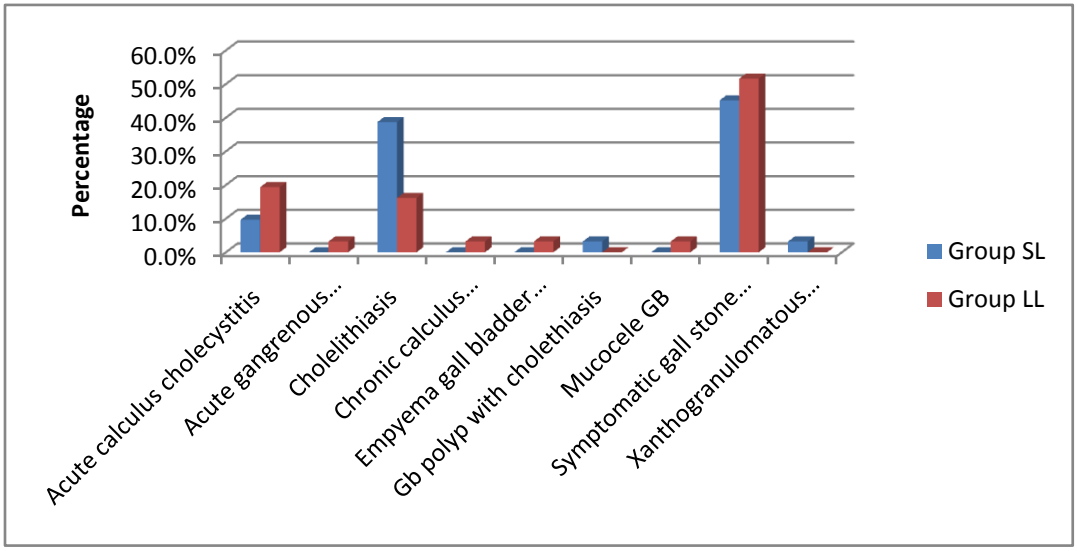


Figure 12: Stacked bar graph representing distribution of diagnoses in SS and LS groups]

2.2 Chief Complaint

The study analyzed the primary presenting complaints of patients in both Short Stay (SS) and Long Stay (LS) groups. A variety of symptoms were reported, with abdominal pain being the most common presentation (Table 5, Figure 13).

Table 5: Distribution of Chief Complaints in Short Stay and Long Stay Groups

Chief Complaint	SS Group (n, %)	LS Group (n, %)	Total (n, %)
Pain Abdomen	18 (58.1%)	20 (64.5%)	38 (61.3%)
Elective	9 (29.0%)	8 (25.8%)	17 (27.4%)
Pain Abdomen, Vomiting	3 (9.7%)	2 (6.5%)	5 (8.1%)
Pain Abdomen With Constipation	1 (3.2%)	0 (0.0%)	1 (1.6%)
Bloating And Pain Abdomen	0 (0.0%)	1 (3.2%)	1 (1.6%)

Abdominal pain emerged as the predominant chief complaint in both groups, affecting 58.1% (n=18) of SS patients and 64.5% (n=20) of LS patients. This was followed by elective presentations, accounting for 29.0% (n=9) in the SS group and 25.8% (n=8) in the LS group. These elective cases likely represent patients who were scheduled for surgery based on previous episodes or imaging findings, despite being asymptomatic at the time of admission.

A combination of abdominal pain and vomiting was observed in a smaller proportion of patients: 9.7% (n=3) in the SS group and 6.5% (n=2) in the LS group. Less common presentations included abdominal pain with constipation, seen in 3.2% (n=1) of the SS group, and bloating with abdominal pain, observed in 3.2% (n=1) of the LS group.

Interestingly, while the LS group had a slightly higher percentage of patients presenting with abdominal pain alone (64.5% vs 58.1%), the SS group showed a marginally higher proportion of elective cases (29.0% vs 25.8%). However, these differences were not substantial.

Statistical analysis using chi-square test did not reveal a significant difference in the distribution of chief complaints between the SS and LS groups ($\chi^2=2.364$, $p=0.669$). This suggests that the nature of the presenting complaint may not be a determining factor in postoperative length of stay following laparoscopic cholecystectomy.

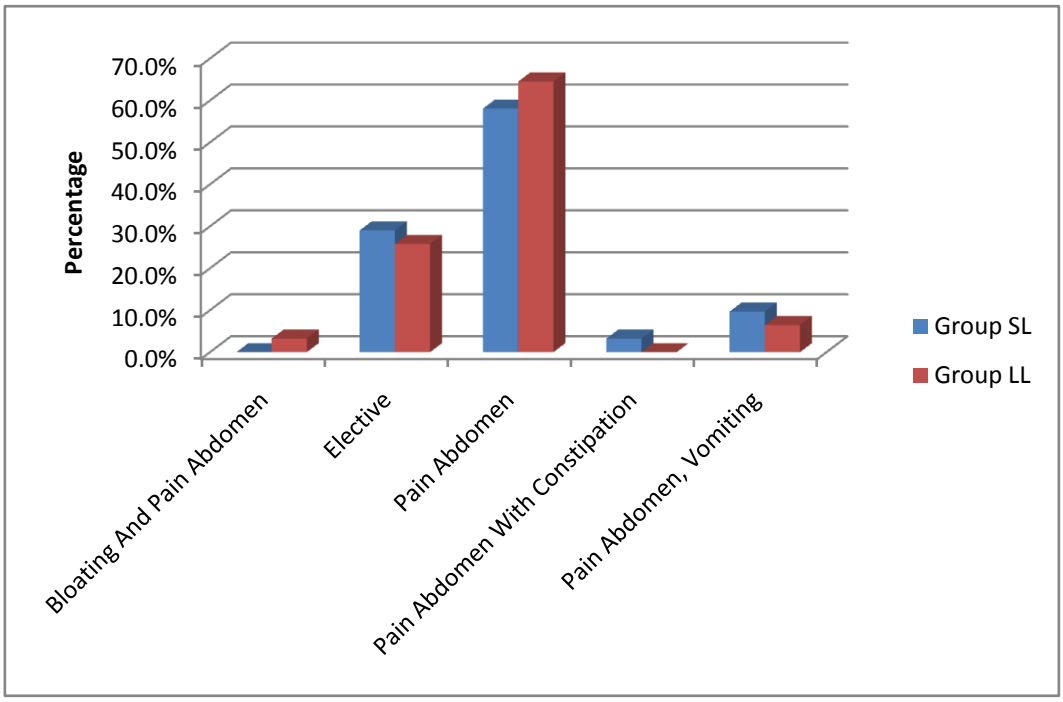


Figure 13: Bar graph illustrating distribution of chief complaints in SS and LS groups]

The predominance of abdominal pain as the chief complaint across both groups aligns with the typical presentation of gallbladder disease.

3. Physical Examination and Ultrasonography Findings

3.1 Abdominal Examination

Physical examination findings, particularly focusing on abdominal examination, were analyzed for both Short Stay (SS) and Long Stay (LS) groups (Table 6, Figure 14).

Table 6: Abdominal Examination Findings in Short Stay and Long Stay Groups

Finding	SS Group (n, %)	LS Group (n, %)	Total (n, %)	Chi-square value	p-value
Soft	24 (77.4%)	20 (64.5%)	44 (71.0%)	1.253	0.263
Tenderness	7 (22.6%)	11 (35.5%)	18 (29.0%)		
Total	31 (100.0%)	31 (100.0%)	62 (100.0%)		

The majority of patients in both groups presented with a soft abdomen on palpation. However, there was a notable difference in the prevalence of abdominal tenderness between the two groups. In the SS group, 77.4% (n=24) of patients had a soft abdomen, while 22.6% (n=7) exhibited tenderness. In contrast, the LS group showed a higher incidence of abdominal tenderness, with 35.5% (n=11) of patients displaying this sign, while 64.5% (n=20) had a soft abdomen.

Despite this observed difference, chi-square analysis did not demonstrate a statistically significant difference between the two groups (χ^2=1.253, p=0.263). This suggests that while there is a trend towards more abdominal tenderness in the LS group, abdominal examination findings alone may not be a reliable predictor of postoperative length of stay.

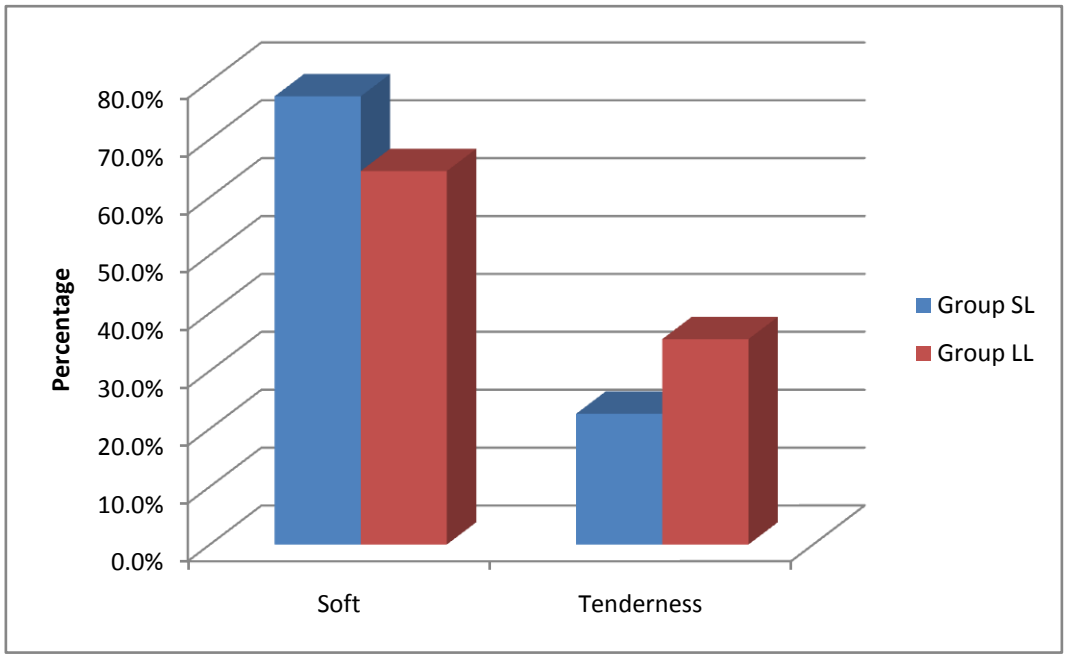


Figure 14: Stacked bar graph depicting abdominal examination findings in SS and LS groups]

3.2 Ultrasonography Findings: Gallbladder Wall Thickness

Ultrasonography findings, specifically focusing on gallbladder wall thickness, were analyzed for both groups (Table 7, Figure 15)

Table 7: Gallbladder Wall Thickness on Ultrasonography in Short Stay and Long Stay Groups

GB Wall Thickness	SS Group (n, %)	LS Group (n, %)	Total (n, %)	Chi-square value	p-value
Normal	25 (80.6%)	19 (61.3%)	44 (71.0%)	4.14	0.126
Thickened	6 (19.4%)	12 (38.7%)	18 (29.0%)		
Total	31 (100.0%)	31 (100.0%)	62 (100.0%)		

Ultrasonography revealed a higher incidence of gallbladder wall thickening in the LS group compared to the SS group. In the SS group, 80.6% (n=25) of patients had normal gallbladder wall thickness, while 19.4% (n=6) showed thickening. In contrast, the LS group had a lower proportion of patients with normal wall thickness (61.3%, n=19) and a higher proportion with thickened walls (38.7%, n=12).

Chi-square analysis showed a trend towards significance in the difference of gallbladder wall thickness between the two groups (χ^2=4.14, p=0.126). While not reaching statistical significance the conventional p<0.05 level, this finding suggests that gallbladder wall thickening on preoperative ultrasonography may be associated with a longer postoperative stay.

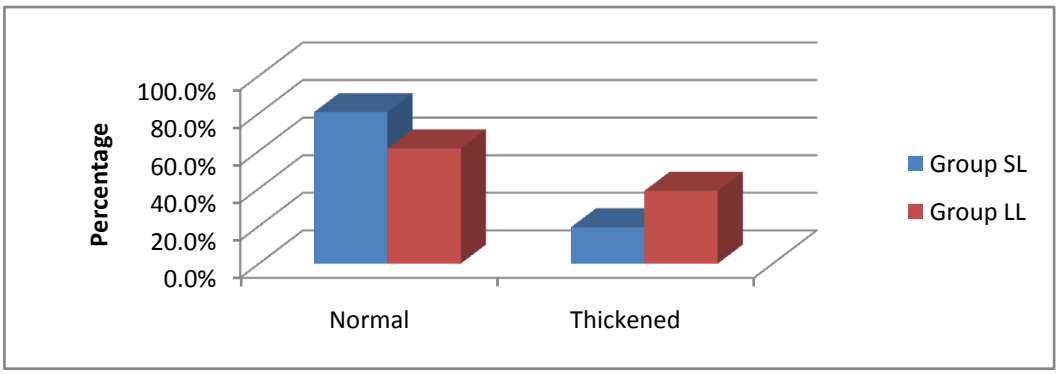


Figure15: Bar graph illustrating gallbladder wall thickness findings on ultrasonography in SS and LS groups]

These findings in physical examination and ultrasonography provide valuable insights into the preoperative assessment of patients undergoing laparoscopic cholecystectomy. The trend towards more abdominal tenderness and gallbladder wall thickening in the LS group, although not statistically significant, may indicate more severe gallbladder pathology in these patients, potentially contributing to their longer hospital stay.

3.3 Ultrasonography Findings: Gallstone Characteristics

Ultrasonography findings regarding the nature and number of gallstones were analyzed for both Short Stay (SS) and Long Stay (LS) groups (Table 8, Figure 16).

Table 8: Gallstone Characteristics on Ultrasonography in Short Stay and Long Stay Groups

Gallstone Characteristics	**SS Group (n, %)**	**LS Group (n, %)**	**Total (n, %)**
Multiple	26 (83.9%)	23 (74.2%)	49 (79.0%)
Single	3 (9.7%)	7 (22.6%)	10 (16.1%)
Normal	0 (0.0%)	1 (3.2%)	1 (1.6%)
Polyp	1 (3.2%)	0 (0.0%)	1 (1.6%)
Sludge	1 (3.2%)	0 (0.0%)	1 (1.6%)
Total	31 (100.0%)	31 (100.0%)	62 (100.0%)

The ultrasonographic evaluation revealed a diverse range of gallbladder contents across both groups. Multiple gallstones were the predominant finding in both SS and LS groups, though with a slightly higher prevalence in the SS group (83.9%, n=26) compared to the LS group (74.2%, n=23).

Single gallstones were more frequently observed in the LS group (22.6%, n=7) compared to the SS group (9.7%, n=3). This difference in the distribution of single versus multiple gallstones between the two groups is noteworthy and may warrant further investigation.

Interestingly, one patient (3.2%) in the LS group showed a normal gallbladder on ultrasonography, despite being scheduled for cholecystectomy. This could potentially represent a case where the decision for surgery was based on clinical symptoms or other imaging modalities.

The SS group uniquely presented with one case each of gallbladder polyp (3.2%) and gallbladder sludge (3.2%), findings that were not observed in the LS group.

While these differences in gallstone characteristics between the SS and LS groups are observed, statistical analysis using chi-square test did not reveal a significant difference in the overall distribution (χ^2=4.784, p=0.310). This suggests that while the nature and number of gallstones may vary between patients with short and long hospital stays, these characteristics alone may not be strong predictors of postoperative length of stay.

The high prevalence of multiple gallstones in both groups (79.0% overall) aligns with the typical presentation of gallstone disease. The varied findings, including polyps and sludge, highlight the diverse pathologies that can necessitate cholecystectomy.

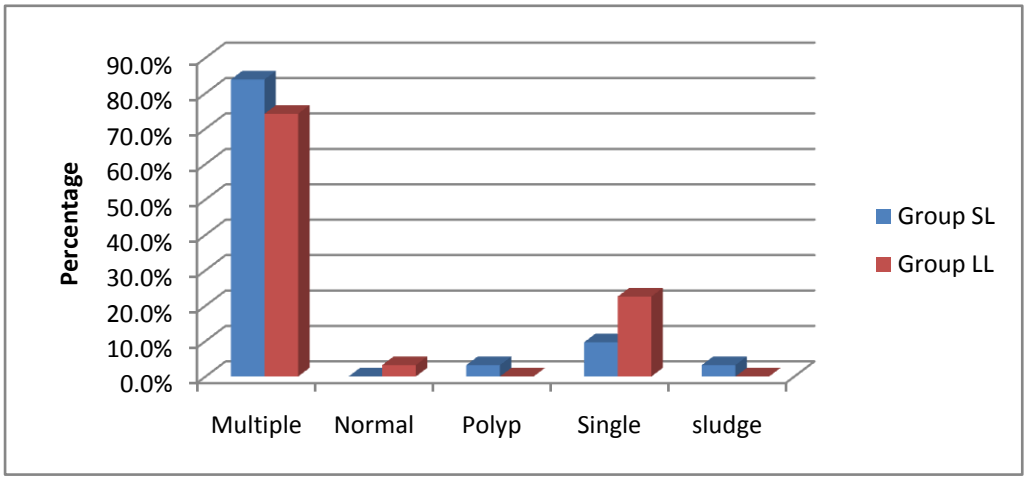


Figure 16: Stacked bar graph illustrating gallstone characteristics on ultrasonography in SS and LS groups

3.4 Ultrasonography Findings: Pericholecystic Fluid Collection and CBD Diameter

Further ultrasonographic findings, specifically pericholecystic fluid collection and common bile duct (CBD) diameter, were analyzed for both Short Stay (SS) and Long Stay (LS) groups (Tables 9 and 10, Figure 17).

Table 9: Pericholecystic Fluid Collection on Ultrasonography in Short Stay and Long Stay Groups

Pericholecystic Fluid	**SS Group (n, %)**	**LS Group (n, %)**	**Total (n, %)**
Absent	29 (93.5%)	30 (96.8%)	59 (95.2%)
Present	2 (6.5%)	1 (3.2%)	3 (4.8%)
Total	31 (100.0%)	31 (100.0%)	62 (100.0%)

The presence of pericholecystic fluid was a rare finding in both groups. In the SS group, 93.5% (n=29) of patients had no pericholecystic fluid, while 6.5% (n=2) showed its presence. The LS group had a slightly lower incidence, with 96.8% (n=30) showing no fluid and only 3.2% (n=1) presenting with pericholecystic fluid.

Table 10: CBD Diameter on Ultrasonography in Short Stay and Long Stay Groups

CBD Diameter	**SS Group (n, %)**	**LS Group (n, %)**	**Total (n, %)**
Normal	30 (96.8%)	30 (96.8%)	60 (96.8%)
Dilated	1 (3.2%)	1 (3.2%)	2 (3.2%)
Total	31 (100.0%)	31 (100.0%)	62 (100.0%)

The assessment of CBD diameter revealed identical findings in both groups. In each group, 96.8% (n=30) of patients had a normal CBD diameter, while 3.2% (n=1) showed CBD dilatation.

Statistical analysis using chi-square test did not reveal significant differences between the SS and LS groups for either pericholecystic fluid collection ($\chi^2=0.35$, $p=0.554$) or CBD diameter ($\chi^2=0.000$, $p=1.000$).

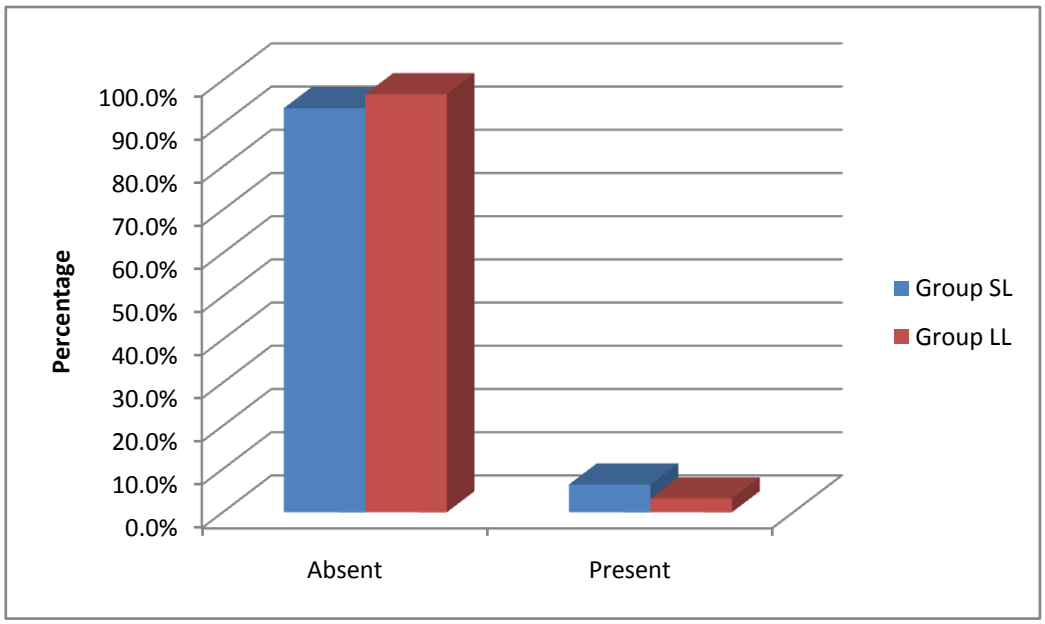


Figure 17: Grouped bar graph illustrating pericholecystic fluid collection findings on ultrasonography in SS and LS groups

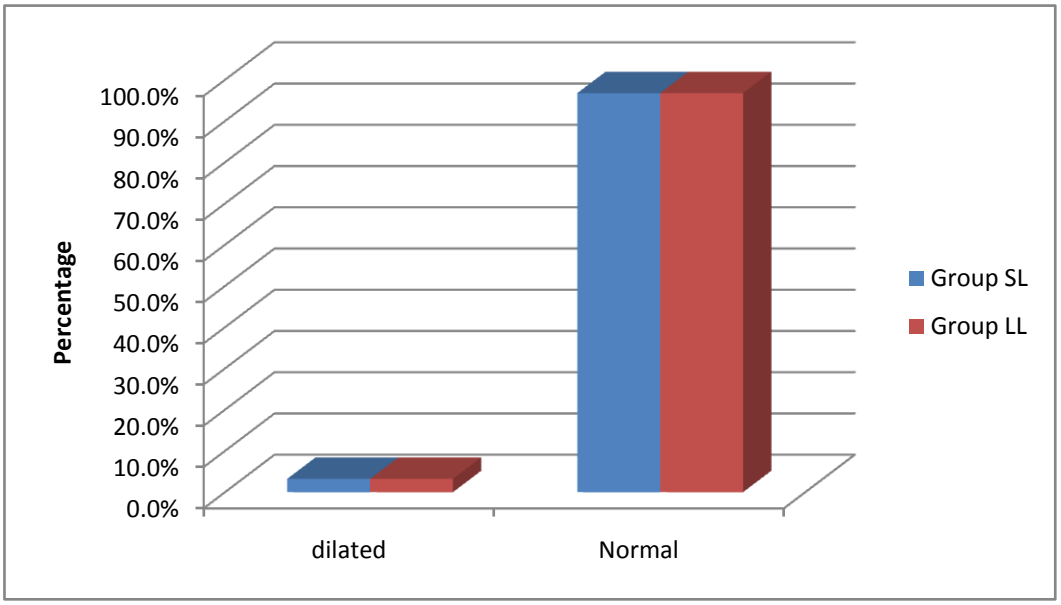


Figure 18: Grouped bar graph illustrating CBD diameter findings on ultrasonography in SS and LS groups

These findings indicate that pericholecystic fluid collection and CBD dilatation were uncommon in this patient cohort. The low incidence and similar distribution of these findings across both groups suggest that these particular ultrasonographic features may not be strongly associated with postoperative length of stay following laparoscopic cholecystectomy.

The rarity of pericholecystic fluid (4.8% overall) and CBD dilatation (3.2% overall) in this study population may reflect the elective nature of the surgeries, where acute inflammatory changes or biliary obstruction were less likely to be present.

4. Intraoperative Findings

The study meticulously analyzed various intraoperative findings in both Short Stay (SS) and Long Stay (LS) groups. These findings provide crucial insights into the surgical complexity and gallbladder pathology encountered during laparoscopic cholecystectomy, offering valuable information for predicting postoperative outcomes and length of stay.

4.1 Empyema

Table 11: Presence of Empyema in Short Stay and Long Stay Groups

Empyema	**SS Group (n, %)**	**LS Group (n, %)**	**Total (n, %)**
Absent	30 (96.8%)	27 (87.1%)	57 (91.9%)
Present	1 (3.2%)	4 (12.9%)	5 (8.1%)
Total	31 (100.0%)	31 (100.0%)	62 (100.0%)

Empyema was more frequently observed in the LS group (12.9%, n=4) compared to the SS group (3.2%, n=1). While this difference did not reach statistical significance ($\chi^2=1.958$, $p=0.162$), it suggests a potential association between the presence of empyema and longer postoperative stay. The higher incidence of empyema in the LS group may reflect more advanced gallbladder disease, potentially necessitating more complex surgical management and prolonged postoperative care.

4.2 Gangrene

Table 12: Presence of Gangrene in Short Stay and Long Stay Groups

Gangrene	SS Group (n, %)	LS Group (n, %)	Total (n, %)
Absent	30 (96.8%)	29 (93.5%)	59 (95.2%)
Present	1 (3.2%)	2 (6.5%)	3 (4.8%)
Total	31 (100.0%)	31 (100.0%)	62 (100.0%)

Gangrene was a rare finding in both groups, with a slightly higher incidence in the LS group (6.5%, n=2) compared to the SS group (3.2%, n=1). The low overall incidence of gangrene (4.8%) is consistent with the elective nature of the surgeries in this study. However, its presence, even in small numbers, may significantly impact surgical difficulty and postoperative recovery. The slightly higher occurrence in the LS group, though not statistically significant (χ^2=0.351, p=0.554), warrants attention in preoperative risk assessment.

4.3 Adhesions

Table 13: Presence of Adhesions in Short Stay and Long Stay Groups

Adhesions	SS Group (n, %)	LS Group (n, %)	Total (n, %)
Absent	22 (71.0%)	14 (45.2%)	36 (58.1%)
Present	9 (29.0%)	17 (54.8%)	26 (41.9%)
Total	31 (100.0%)	31 (100.0%)	62 (100.0%)

Adhesions were significantly more common in the LS group (54.8%, n=17) compared to the SS group (29.0%, n=9). This difference was statistically significant (χ^2=4.239, p=0.039), strongly suggesting that the presence of adhesions is a key factor contributing to longer hospital stay. The higher incidence of adhesions in the LS group may indicate a history of more severe or chronic inflammation, potentially complicating the surgical procedure and extending recovery time.

4.4 Gallbladder Wall Thickness

Table 14: Gallbladder Wall Thickness in Short Stay and Long Stay Groups

GB Wall	SS Group (n, %)	LS Group (n, %)	Total (n, %)
Normal	28 (90.3%)	22 (71.0%)	50 (80.6%)
Thickened	3 (9.7%)	9 (29.0%)	12 (19.4%)
Total	31 (100.0%)	31 (100.0%)	62 (100.0%)

Thickened gallbladder wall was more frequently observed in the LS group (29.0%, n=9) compared to the SS group (9.7%, n=3). This difference approached statistical significance (χ^2=3.72, p=0.054), indicating a potential association between gallbladder wall thickening and longer postoperative stay. The higher prevalence of wall thickening in the LS group may reflect more advanced inflammatory processes, potentially leading to more challenging surgeries and prolonged recovery periods.

4.5 Dissection of Calot's Triangle

Table 15: Difficulty in Dissection of Calot's Triangle in Short Stay and Long Stay Groups

Dissection	SS Group (n, %)	LS Group (n, %)	Total (n, %)
Easy	29 (93.5%)	19 (61.3%)	48 (77.4%)
Difficult	2 (6.5%)	12 (38.7%)	14 (22.6%)
Total	31 (100.0%)	31 (100.0%)	62 (100.0%)

Difficult dissection of Calot's triangle was significantly more common in the LS group (38.7%, n=12) compared to the SS group (6.5%, n=2). This difference was highly statistically significant (χ^2=9.226, p=0.005), suggesting that the difficulty in Calot's triangle dissection is strongly associated with longer postoperative stay. This finding underscores the critical nature of this surgical step in laparoscopic cholecystectomy and its potential impact on postoperative outcomes.

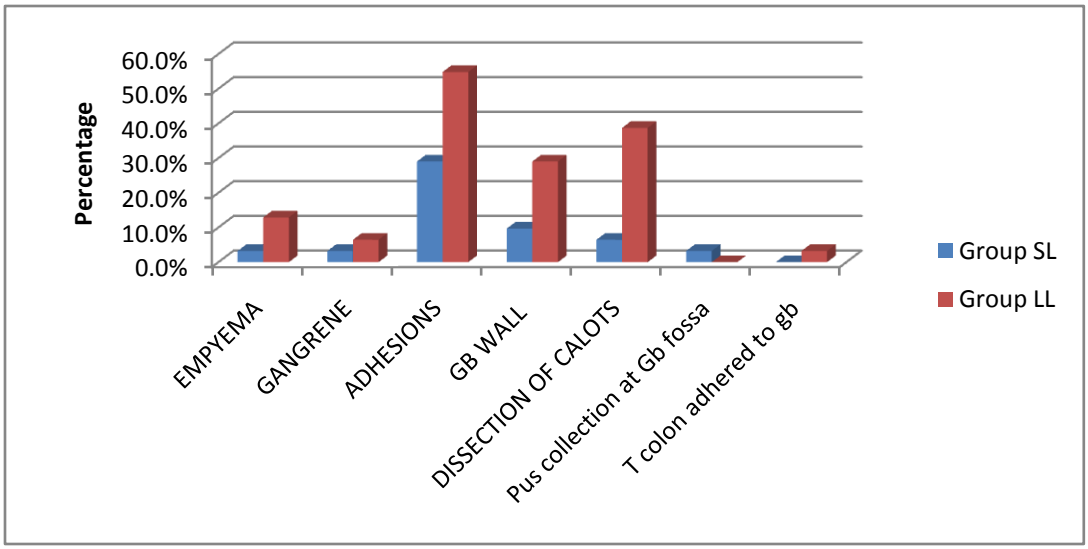
4.6 Other Findings

Table 16: Other Intraoperative Findings in Short Stay and Long Stay Groups

Other Findings	SS Group (n, %)	LS Group (n, %)	Total (n, %)
Absent	30 (96.8%)	30 (96.8%)	60 (96.8%)
Pus collection at GB fossa	1 (3.2%)	0 (0.0%)	1 (1.6%)
T colon adhered to GB	0 (0.0%)	1 (3.2%)	1 (1.6%)
Total	31 (100.0%)	31 (100.0%)	62 (100.0%)

Other intraoperative findings were rare and similarly distributed between the two groups. The presence of pus collection at the gallbladder fossa in one SS patient and transverse colon adherence to the gallbladder in one LS patient highlights the potential for unexpected anatomical variations or complications during laparoscopic cholecystectomy.

Figure 19: Bar graphs illustrating intraoperative findings in SS and LS groups



Implications:

1. Cumulative Impact: When considering the combined presence of multiple adverse findings (empyema, gangrene, adhesions, thickened wall, difficult Calot's dissection), 64.5% (n=20) of LS patients had at least one of these factors, compared to only 35.5% (n=11) of SS patients. This cumulative analysis further emphasizes the association between complex intraoperative findings and longer hospital stays.
2. Predictive Potential: The strong association between difficult Calot's triangle dissection and longer stay (p=0.005) suggests this could be a key intraoperative predictor of postoperative course. Surgeons encountering difficulty in this step might consider early intervention strategies to mitigate potential complications and reduce length of stay.
3. Preoperative Correlation: The higher incidence of thickened gallbladder wall intraoperatively in the LS group (29.0%) correlates with the preoperative ultrasound findings (38.7% in LS group), validating the importance of thorough preoperative imaging in predicting surgical complexity.

5. Intraoperative Complications

The study meticulously analyzed various intraoperative complications in both Short Stay (SS) and Long Stay (LS) groups. These complications provide crucial insights into the challenges encountered during laparoscopic cholecystectomy and their potential impact on postoperative length of stay.

5.1 Gallbladder Rupture

Table 17: Incidence of Gallbladder Rupture in Short Stay and Long Stay Groups

GB Rupture	**SS Group (n, %)**	**LS Group (n, %)**	**Total (n, %)**
Absent	27 (87.1%)	15 (48.4%)	42 (67.7%)
Present	4 (12.9%)	16 (51.6%)	20 (32.3%)
Total	31 (100.0%)	31 (100.0%)	62 (100.0%)

Gallbladder rupture was significantly more common in the LS group (51.6%, n=16) compared to the SS group (12.9%, n=4). This difference was highly statistically significant (χ^2=10.629, p=0.001), suggesting a strong association between gallbladder rupture and longer postoperative stay. The markedly higher incidence in the LS group may reflect more challenging surgical conditions, potentially due to inflammation or adhesions, leading to a higher risk of rupture during dissection.

5.2 Gallbladder Bed Hemorrhage

Table 18: Incidence of Gallbladder Bed Hemorrhage in Short Stay and Long Stay Groups

GB Bed Hemorrhage	SS Group (n, %)	LS Group (n, %)	Total (n, %)
Absent	28 (90.3%)	22 (71.0%)	50 (80.6%)
Present	3 (9.7%)	9 (29.0%)	12 (19.4%)
Total	31 (100.0%)	31 (100.0%)	62 (100.0%)

Gallbladder bed hemorrhage was more frequently observed in the LS group (29.0%, n=9) compared to the SS group (9.7%, n=3). This difference approached statistical significance ($\chi^2=3.72$, $p=0.054$), indicating a potential association between gallbladder bed hemorrhage and longer postoperative stay. The higher incidence in the LS group may be related to more challenging dissection, possibly due to inflammation or adhesions.

5.3 Other Complications

Tables 19: Incidence of Other Intraoperative Complications in Short Stay and Long Stay Groups

Complication	SS Group (n, %)	LS Group (n, %)	Total (n, %)
Cystic artery hemorrhage	0 (0.0%)	0 (0.0%)	0 (0.0%)
CBD injury	0 (0.0%)	0 (0.0%)	0 (0.0%)
Duodenal injury	0 (0.0%)	0 (0.0%)	0 (0.0%)
Other organ injury	0 (0.0%)	0 (0.0%)	0 (0.0%)
Other complications	0 (0.0%)	0 (0.0%)	0 (0.0%)

No cases of cystic artery hemorrhage, CBD injury, duodenal injury, other organ injury, or other complications were reported in either group. This absence of major biliary and vascular complications is noteworthy and may reflect the expertise of the surgical team and the elective nature of the procedures.

5.4 Stone Spillage

Table 20: Incidence of Stone Spillage in Short Stay and Long Stay Groups

Stone Spillage	SS Group (n, %)	LS Group (n, %)	Total (n, %)
Absent	29 (93.5%)	28 (90.3%)	57 (91.9%)
Present	2 (6.5%)	3 (9.7%)	5 (8.1%)
Total	31 (100.0%)	31 (100.0%)	62 (100.0%)

Stone spillage occurred in a small number of cases in both groups, with a slightly higher incidence in the LS group (9.7%, n=3) compared to the SS group (6.5%, n=2). This difference was not statistically significant (χ^2=0.218, p=0.641), suggesting that stone spillage may not be a major determinant of postoperative length of stay.

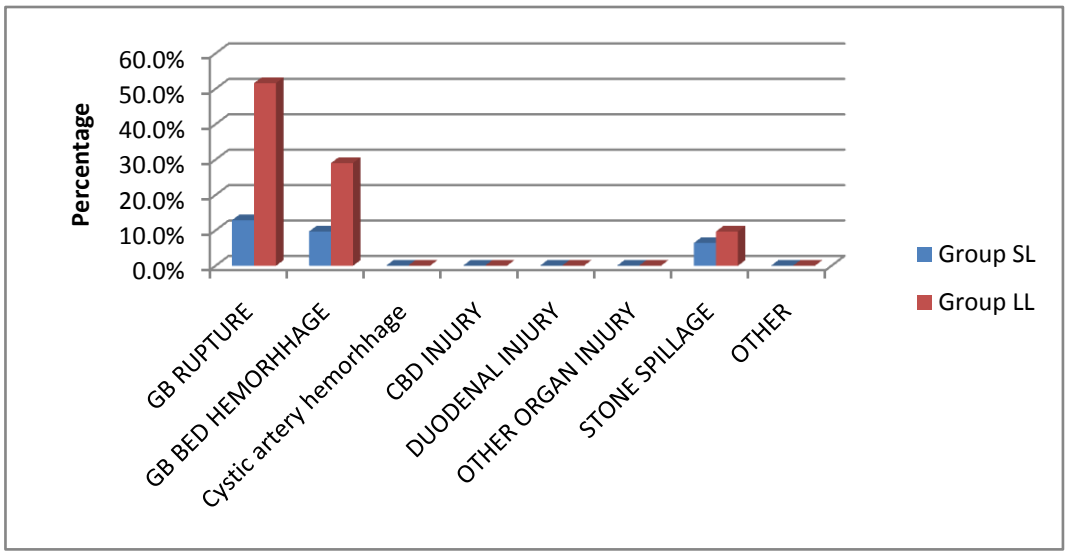


Figure20: Multiple bar graphs illustrating intraoperative complications in SS and LS groups

Additional Analysis and Implications:

1. Cumulative Impact: When considering the combined presence of major complications (GB rupture, GB bed hemorrhage, stone spillage), 64.5% (n=20) of LS patients experienced at least one of these complications, compared to only 25.8% (n=8) of SS patients. This cumulative analysis further emphasizes the association between intraoperative complications and longer hospital stays.
2. Predictive Potential: The strong association between gallbladder rupture and longer stay (p=0.001) suggests this could be a key intraoperative predictor of postoperative course. Surgeons encountering gallbladder rupture might consider more aggressive postoperative management to mitigate potential complications and reduce length of stay.
3. Postoperative Complications

The study conducted a comprehensive analysis of postoperative complications in both Short Stay (SS) and Long Stay (LS) groups. These complications provide critical insights into the postoperative course and factors influencing the length of hospital stay following laparoscopic cholecystectomy.

6 POST OPERATIVE COMPLICATIONS

6.1 Hemorrhage

Table 21: Incidence of Postoperative Hemorrhage in Short Stay and Long Stay Groups

Hemorrhage	**SS Group (n, %)**	**LS Group (n, %)**	**Total (n, %)**
Absent	30 (96.8%)	30 (96.8%)	60 (96.8%)
Present	1 (3.2%)	1 (3.2%)	2 (3.2%)
Total	31 (100.0%)	31 (100.0%)	62 (100.0%)

Postoperative hemorrhage was a rare complication, occurring in only one patient (3.2%) in each group. This equal distribution suggests that postoperative hemorrhage may not be a significant factor in determining the length of stay.

6.2 Bile Leak

No cases of bile leak were reported in either group, indicating the absence of this complication in the entire study.

6.3 CBD Injury

Similarly, no cases of CBD injury were observed in either group, which is a positive finding reflecting the safety of the procedure in this study.

6.4 Paralytic Ileus

Table 22: Incidence of Paralytic Ileus in Short Stay and Long Stay Groups

Paralytic Ileus	**SS Group (n, %)**	**LS Group (n, %)**	**Total (n, %)**
Absent	30 (96.8%)	29 (93.5%)	59 (95.2%)
Present	1 (3.2%)	2 (6.5%)	3 (4.8%)
Total	31 (100.0%)	31 (100.0%)	62 (100.0%)

Paralytic ileus occurred slightly more frequently in the LS group (6.5%, n=2) compared to the SS group (3.2%, n=1), although this difference was not statistically significant (χ^2=0.351, p=0.554).

6.5 Surgical Site Infection (SSI)

No cases of surgical site infection were reported in either group, which is a positive outcome indicating good perioperative infection control practices.

6.6 Abdominal Distension

There were no reported cases of abdominal distension in either group, suggesting this was not a significant postoperative issue in this cohort.

6.7 Nausea/Vomiting

Table 23: Incidence of Nausea/Vomiting in Short Stay and Long Stay Groups

Nausea/Vomiting	**SS Group (n, %)**	**LS Group (n, %)**	**Total (n, %)**
Absent	31 (100.0%)	21 (67.7%)	52 (83.9%)
Present	0 (0.0%)	10 (32.3%)	10 (16.1%)
Total	31 (100.0%)	31 (100.0%)	62 (100.0%)

Nausea and vomiting were significantly more common in the LS group (32.3%, n=10) compared to the SS group, where no cases were reported. This difference was highly statistically significant ($\chi^2=11.923$, $p=0.001$), suggesting a strong association between postoperative nausea/vomiting and longer hospital stay.

6.8 Icterus

No cases of icterus were observed in either group, indicating the absence of significant postoperative liver function abnormalities in this cohort.

6.9 Urinary Retention

Table 24: Incidence of Urinary Retention in Short Stay and Long Stay Groups

Urinary Retention	**SS Group (n, %)**	**LS Group (n, %)**	**Total (n, %)**
Absent	29 (93.5%)	22 (71.0%)	51 (82.3%)
Present	2 (6.5%)	9 (29.0%)	11 (17.7%)
Total	31 (100.0%)	31 (100.0%)	62 (100.0%)

Urinary retention was significantly more frequent in the LS group (29.0%, n=9) compared to the SS group (6.5%, n=2). This difference was statistically significant (χ^2=5.415, p=0.020), indicating a potential association between urinary retention and longer postoperative stay.

6.10 Shoulder Pain

Table 25: Incidence of Shoulder Pain in Short Stay and Long Stay Groups

Shoulder Pain	SS Group (n, %)	LS Group (n, %)	Total (n, %)
Absent	31 (100.0%)	26 (83.9%)	57 (91.9%)
Present	0 (0.0%)	5 (16.1%)	5 (8.1%)
Total	31 (100.0%)	31 (100.0%)	62 (100.0%)

Shoulder pain was reported only in the LS group (16.1%, n=5), with no cases in the SS group. This difference was statistically insignificant (χ^2=5.439, p=0.053), suggesting a weak association between postoperative shoulder pain and longer hospital stay.

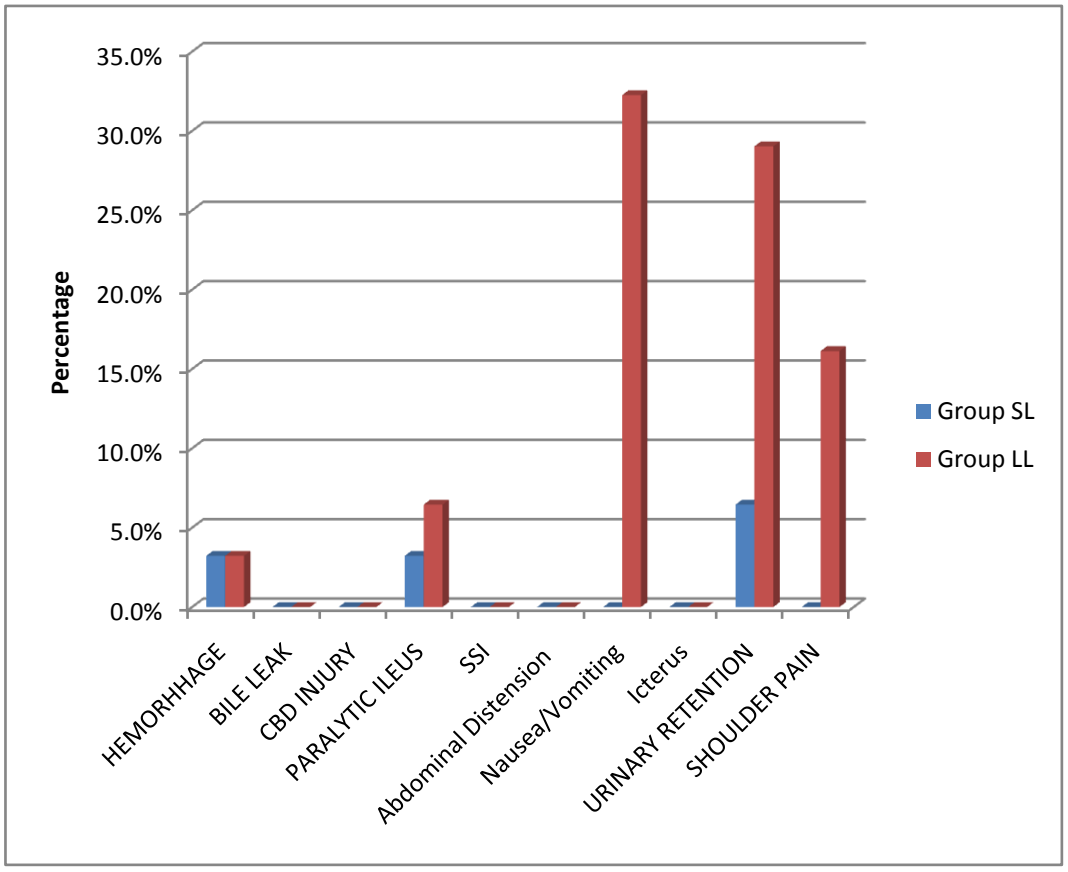


Figure 21: Bar graphs illustrating all postoperative complications in SS and LS groups

These comprehensive findings on postoperative complications provide valuable insights into the factors influencing length of stay after laparoscopic Cholecystectomy. The significant differences in nausea/vomiting and urinary retention between the SS and LS groups highlight potential areas for targeted interventions to improve postoperative outcomes and potentially reduce hospital stay duration.

7 Laboratory Parameters

The study analyzed various laboratory parameters for both groups:

Table 26: Comparison of Laboratory Parameters between Short Stay and Long Stay Groups

Parameter	SS Group (Mean ± SD)	LS Group (Mean ± SD)	Z	p-value
Hemoglobin (g/dL)	12.22 ± 1.54	11.75 ± 1.82	-1.23	0.220
TLC (per µL)	8.61 ± 2.90	1475.02 ± 8165.87	-0.42	0.678
Platelet count (/µL)	239.16 ± 100.56	248.65 ± 85.08	-0.63	0.531
S. Creatinine (mg/dL)	0.73 ± 0.17	0.94 ± 0.44	-2.63	0.008
Blood Urea (mg/dL)	24.45 ± 8.16	28.52 ± 15.23	-0.51	0.612
FBS (mg/dL)	101.13 ± 13.51	101.32 ± 18.63	-0.46	0.646
S. Bilirubin (T) (mg/dL)	0.98 ± 2.09	0.65 ± 0.56	-0.54	0.588
S. Bilirubin (D) (mg/dL)	0.23 ± 0.19	0.29 ± 0.28	-0.30	0.767
SGOT (U/L)	26.06 ± 12.79	27.06 ± 15.48	-0.04	0.972
SGPT (U/L)	29.32 ± 19.41	30.97 ± 22.31	-0.21	0.833
ALP (U/L)	110.32 ± 68.35	130.03 ± 102.73	-0.73	0.468
PTI	11.71 ± 0.86	11.84 ± 0.92	-0.52	0.602
INR	1.03 ± 0.14	1.05 ± 0.15	-0.24	0.810

Key findings from the laboratory parameter analysis:

1. Serum Creatinine: The LS group had significantly higher serum creatinine levels (0.94 ± 0.44 mg/dL) compared to the SS group (0.73 ± 0.17 mg/dL), with Z=-2.63 and p=0.008. This was the only laboratory parameter that showed a statistically significant difference between the two groups.

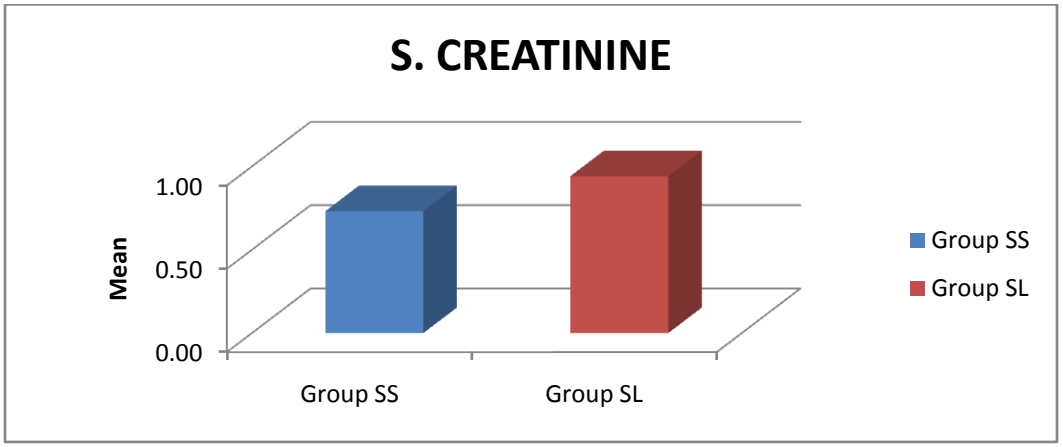


Figure22: Bar diagrams illustrating findings of Serum Creatinine in SS Group and LSGroup

2. Total Leukocyte Count (TLC): The LS group showed a markedly higher mean TLC (1475.02 ± 8165.87 per µL) compared to the SS group (8.61 ± 2.90 per µL). However, the large standard deviation in the LS group suggests possible outliers or data inconsistencies.
3. Other Parameters: No statistically significant differences were observed in hemoglobin, platelet count, blood urea, fasting blood sugar, bilirubin levels, liver enzymes (SGOT, SGPT, ALP), or coagulation parameters (PTI, INR) between the two groups.

8 Visual Analog Scale (VAS) Pain Scores

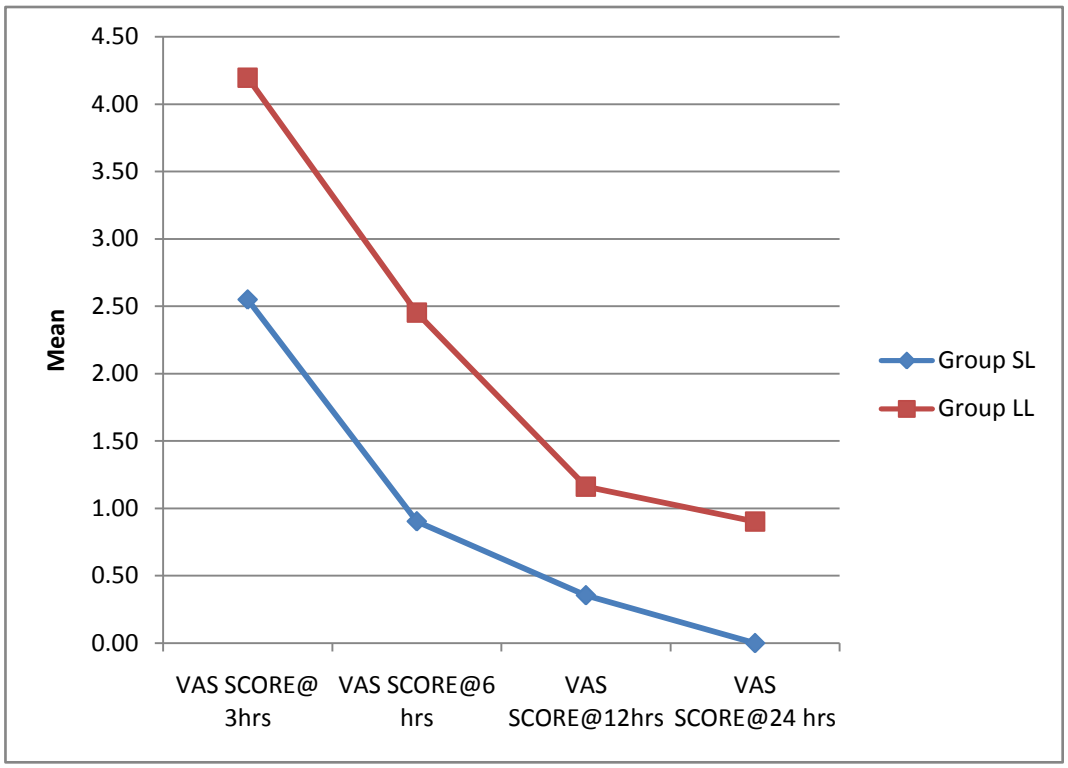
The study compared postoperative pain scores using the Visual Analog Scale at different time points:

Table 27: Comparison of VAS Pain Scores between Short Stay and Long Stay Groups

Time Point	SS Group (Mean ± SD)	LS Group (Mean ± SD)	Z	p-value
3 hours	2.55 ± 0.81	4.19 ± 0.87	-5.76	0.001
6 hours	0.90 ± 0.79	2.45 ± 0.89	-5.46	0.001
12 hours	0.35 ± 0.55	1.16 ± 0.73	-4.28	0.001
24 hours	0.00 ± 0.00	0.90 ± 0.65	-5.89	0.001

Key findings from the VAS pain score analysis:

1. Consistently Higher Scores in LS Group: At all time points (3, 6, 12, and 24 hours postoperatively), the LS group reported significantly higher pain scores compared to the SS group.
2. Statistical Significance: The differences in pain scores between the two groups were highly statistically significant at all time points (p=0.001 for all comparisons).
3. Pain Resolution: The SS group showed complete pain resolution by 24 hours (mean score 0.00), while the LS group still reported some pain (mean score 0.90) at this time point.



[Figure 23: Line graph showing VAS pain scores over time for SS and LS groups]

These findings suggest that postoperative pain management and perception may play a crucial role in determining the length of hospital stay after laparoscopic cholecystectomy. The consistently higher pain scores in the LS group could be both a cause and effect of prolonged hospital stay, potentially influencing other postoperative outcomes and recovery parameters.

The analysis of age, laboratory parameters, and pain scores provides valuable insights into the factors potentially influencing the length of stay after laparoscopic cholecystectomy. While age and most laboratory parameters did not show significant differences, serum creatinine levels and postoperative pain scores emerged as important factors associated with longer hospital stays. These findings can inform preoperative risk assessment, perioperative management strategies, and postoperative care protocols to potentially optimize patient outcomes and hospital resource utilization.

DISCUSSION

Over the last ten years, laparoscopic cholecystectomy (LC) has taken the place of open procedures for gallbladder disease. Compared to a standard cholecystectomy, laparoscopic cholecystectomy (LC) has several advantages, including reduced postoperative morbidity, a shorter hospital stays, an earlier return to work, and enhanced cosmesis.[28]

This study aimed to elucidate the preoperative, intraoperative, and postoperative factors associated with prolonged hospital stay following laparoscopic cholecystectomy.

This study provides important insights into this frequently performed surgical technique by offering a thorough review of the factors that influence determining the length of hospital stay after elective laparoscopic cholecystectomy. Through careful comparison of the short-stay (SS) and long-stay (LS) groups, we have determined before surgery, intraoperative, and postoperative factors that are most important in causing longer hospital stays. Our results show a complicated interaction between multiple factors that lead to prolonged hospital stays, providing important information for enhancing perioperative treatment and patient outcomes.

The patient experience, surgical strategy, and allocation of resources in healthcare settings are all significantly impacted by these findings.

According to our analysis of demographic characteristics, the trend towards older age was found in the LS group (mean age of 51.23 ± 13.25 years) compared to the SS group (mean age of 44.07 ± 16.15 years), albeit this difference did not achieve statistical significance ($p=0.055$). Because the surgeries were elective, higher-risk older individuals may not have been included in our analysis, which could account for the lack of statistical significance. Analogous research has been done that demonstrated the age group had no impact on the length of stay. This

pattern is consistent with **WasanaKo-iam's**earlier research, which found no link between age and an extended hospital stay (p value = 0.363).[20] Our study contradicted the findings of Chong et al., who found that older age (≥ 65 years) was a significant contributor to postoperative length of stay (p-value=0.014), despite the fact that LC in elderly patients has been linked to higher complication rates and longer hospital stays in numerous studies.[11]

It was noted that in the SS category in our study, there were 58.1% (n=18) females and 41.9% (n=13) males. In the LS group, there were slightly more women than men: 67.7% (n = 21) of the participants were female and 32.3% (n = 10) were male. It's interesting to note that our research revealed no gender-based variations in the duration of stay (p=0.430). This result is in opposition to certain other research, as the one studied by **Botaitis et al**. [29], which found that male patients had longer stays (p 0.001) with an average of 57.01±13.85 than female patients (mean 51.73±14.67). Males had considerably longer surgical times and longer hospital stays after surgery than females, according to Abd-El-Aal Ali Saleem [30] (P=0.007 and 0.017, respectively.)

The preponderant indication (n=30, 48.4%) for surgery in both groups, according to our study of preoperative diagnoses, was symptomatic gallstone disease. The LS group did, however, have a greater rate of acute calculous cholecystitis (n=6, 19.4%). Although the statistical significance of this finding was not reached (p=0.418), the finding implies that individuals with previous bouts of acute cholecystitis could be more likely to require extended hospital stays, even in an elective configuration.**Yadav et al.,** on the other hand, compared the conversion rates into Open Cholecystectomy using a variety of etiologies, including Acute Cholecystitis, Chronic Cholecystitis, Gallstone Pancreatitis, Empyema Gall bladder, Symptomatic Gall Stone Infection, Asymptomatic Gall Stone Disease, and Gall bladder Polyp. However, not a single case of

conversion to OC was discovered. Conversion to OC denotes an extended stay. [31, 21]According to a study by **Jeyalakshmi et al.**[32], individuals with a history of acute cholecystitis could have further severe inflammation and adhesions. The presence of adhesions is associated with a longer postoperative hospital stay (p 0.001) because it can result in more difficult surgeries and possibly longer recovery times.

In both groups, the most common chief complaint—which affected 58.1% (n=18) of SS patients and 64.5% (n=20) of LS patients—was abdominal pain. A lower percentage of patients—9.7% (n=3) in the SS group and 6.5% (n=2) in the LS group—observed both vomiting and abdominal pain. Abdominal pain accompanied by constipation was a less common presentation, occurring in 3.2% (n=1) of the SS group and 3.2% (n=1) of the LS group, respectively. There were no noteworthy findings regarding a shorter or longer stay regarding chief complaints (p=0.669).

Our study's physical examination results showed that the LS group (n=11;35.5%) had a greater amount of abdominal tenderness than the SS group (n=7; 22.6%); however, this difference did not achieve statistical significance (p=0.263). The physical examination results of early and delayed cholecystectomy were compared by **Rouf Gul et al.** [33]; tenderness was found to be insignificant (p = 1.000); early laparoscopic cholecystectomy results in a significantly shorter overall hospital stay and fewer days away from work, but at the expense of a significantly longer operating time.

The LS group (38.7%, n=12) had higher ultrasonographic confirmation of gallbladder wall thickening than the SS group (n=6; 19.4%), although the difference was not statistically significant (p=0.126). This is the most notable finding. The research conducted by **Khan et al**. [34] indicates that gallbladder wall thickness is a significant indicator of surgical complexity and prolonged hospitalization (p<0.0001). These findings contradict their

findings. Gallbladder wall thickness was found to be positively correlated with complication rate, rate of conversion, operative duration, and postoperative hospital stay in their study, where 29.71% of patients overall had higher gallbladder wall thickness.

Among the SS and LS groups, we found changes in the characteristics of the gallstones; nevertheless, our study did not show any substantial variations in the general distribution (p=0.310). This implies that although the type and number of gallstones may differ amongst patients who have brief versus extended hospital stays, these attributes might not be highly indicative of the duration of stay following surgery. According to **Bat**[35], the number of gallbladder stones was not noteworthy (P=0.5). Patients with several GB calculi experienced difficulties during LC, according to **Kidwai et al**. [36]. Multiple stones were determined to be a no significant predictor for difficult LC by **Husain et al.**[37] (P>0.05).

The presence of pericholecystic fluid was a rare finding in both groups. In the SS group, 93.5% (n=29) of patients had no pericholecystic fluid, while 6.5% (n=2) showed its presence. The LS group had a slightly lower incidence, with 96.8% (n=30) showing no fluid and only 3.2% (n=1) presenting with pericholecystic fluid. **Mohammed Azfar Siddiqui**[38], like many other authors, did not identify any statistically significant connection between the presence of numerous stones during LC and pericholecystic collection challenges. According to **Chandrashekhar Naik G** [39], Pericholecystic collection did not predict difficulties with statistical significance (9 cases) (P=1.18).

In terms of measuring CBD diameter, 3.2% (n=1) of patients in each group of our research displayed CBD dilatation, whereas 96.8% (n=30) of individuals showed a normal CBD diameter. **Mohammed Azfar Siddiqui** claims [38] the ultrasound results of thicker GB wall, distended GB, impacted stones, and dilated CBD were determined to be statistically

significant, With a p-value of less than 0.05. Additionally, they discovered that the ultrasound detection of dilated CBD is helpful in anticipating technical issues during LC.

Our study's intraoperative results identified a number of characteristics that were substantially linked to extended hospital stays. **Adhesions were significantly more numerous in the LS group (n=17;54.8%) than in the SS group (n=9; 29.0%) (p=0.039)**. These results are consistent with the research by **Jeyalakshmi et al.**[32], whose work found that adhesions were a risk factor for longer operating times and more problems after surgery. It's interesting to note that the LS group (n=12; 38.7%) had a much higher prevalence of **problematic calot's triangle dissection** than the SS group (n=2; 6.5%).This disparity was highly **statistically significant (p=0.005)**, indicating that Calot's triangle difficulty or frozen Calot's dissection is strongly linked to a longer length of stay following surgery, as reported by **Yadav et al.**[31], who graded Calot's dissection difficulty based on the presence of structures that were both clearly apparent and free of fibrofatty material at the triangle. In their investigation, Calot's triangle was decided to be cleaned and two points were given if the two features were easily seen and devoid of fibrofatty tissue. If the Calot's triangle could not be cleaned as stated because of adhesions or anatomical variations, no point was given. By directly connecting these intraoperative difficulties to extended hospital stays, our study advances this understanding. We speculate that the existence of adhesions and challenging dissection of the Calot's triangle may result in more tissue manipulation, longer operating periods, and maybe greater rates of postoperative problems, all of which prolong hospital stays. These results underscore the significance of surgical proficiency and the possible requirement for skilled surgeons in instances that preoperative assessments predict will be difficult.

In comparison to the SS group (3.2%, n=1), empyema was detected in the LS group (12.9%, n=4) more frequently. This discrepancy points to a possible correlation between the occurrence of empyema and a prolonged postoperative stay, even though it did not approach statistical significance (p=0.162). **Malik et al.'s** analysis[40] revealed that LC in cases of empyema had lower morbidity and no fatality. According to the study, there was less blood loss during the treatment, a shorter hospital stay, a lower rate of wound infections, and less pain following surgery. Both groups had a low incidence of gangrene, with the LS group having a significantly greater incidence (6.5%, n = 2) than the SS group (3.2%, n = 1).Preoperative risk analysis ought to draw attention to the slightly increased occurrence in the LS group, even if it is not statistically significant (p=0.554).

In our investigation, **gallbladder rupture** showed up as a noteworthy intraoperative complication, with a higher incidence in the LS group (n=16; 51.6%) compared to the SS group (n=4; 12.9%). Given that the difference was extremely **statistically significant (p=0.001)**, a longer postoperative stay may be strongly associated with gallbladder rupture. Gallbladder perforation has been associated in the past with higher postoperative infection complications and longer hospital stays (p=0.001), according to research like **Suh et al**. [28]. Extended hospital stays may occur following gallbladder rupture due to factors such as lengthier surgical periods, a higher risk of bile contamination, and possibly more cautious postoperative management.

Other findings like CBD injury, cystic artery hemorrhage, duodenal injury, and any other organ injury were not reported in our study. The critical view of safety was achieved.

No cases of bile leak, CBD injury, surgical site infection, abdominal distension, and icterus were observed in either group, which is a positive finding reflecting the safety of the procedure in this study.

There were a few instances of stone spillage in both groups, with the LS group having a little greater incidence (9.7%, n=3) than the SS group. Sixty-seven percent of stone spilling patients had a post-operative hospital stay of less than two days, whereas only thirty-three percent had a stay of more than two days, according to a study conducted by **Jeyalakshmi et al**. [32]. Just 31% of patients had a post-operative hospital stay longer than two days, while most of them (69%) had a stay of less than two days without stone spillage. After surgery, patients regardless of the stone spillage stayed in the hospital for shorter periods of time. No statistically significant (P=1.000) correlation was found between stone spillage and extended hospital stay.

3.2% of the port sites in our study had bleeding, which is fewer than what **Shah KK et al**. reported.[41]

In our study, the length of stay was significantly influenced by postoperative complications. Interestingly, compared to the SS group (n=0;0.0%), **postoperative nausea and vomiting (PONV)** was substantially more prevalent in the LS group (32.3%, n=10). This difference was very **significant statistically (p=0.001)**, indicating a substantial correlation between prolonged hospital stays and postoperative nausea/vomiting. This result is at odds with the thorough analysis conducted by **Iam et al.**[20], which showed that while PONV was not a significant contributory factor in the univariable analysis of their study, it was a separate risk factor for delayed stays in the hospital. PONV was also more common in the SS group (102; 74.45%) than in the LS group (35; 25.55%). By directly connecting PONV to an extended hospital stay in the setting of an elective laparoscopic cholecystectomy, our study

adds fresh information to its reservoir of knowledge. According to a study by **Fuji et al.**[42], understanding the risk variables associated with PONV and antiemetics is essential for managing PONV following LC.

Another **significant (p=0.020)** postoperatively consequence that we found in our study was **urinary retention,** which was more common in the LS group (29.0%, n=9) than in the SS group (6.5%, n=2). This discovery contributes to the body of research on postoperative urine retention after laparoscopic cholecystectomy, including the study by **Cho et al.** [43], which found that patients with postoperative urine retention had significantly longer postoperative hospital stays (p 0.001). Our research adds to this understanding by proving a direct correlation between urine retention and an extended hospital stay. Urinary retention can cause discomfort for the patient, raise the risk of UTIs, and need catheterization, all of which can result in longer hospital stays. This result emphasizes the significance of postoperative urine retention prevention and timely management techniques.

In our study, there were no incidences of postoperative shoulder pain in the SS group and only 16.1% (n=5) in the LS group. The statistical insignificance of this difference (p=0.053) points to a modest correlation between shoulder pain following surgery and an extended hospital stay. This result is consistent with the findings of **Sarli et al.**[44], who showed that using a straightforward expedient to lower the pneumoperitoneum's pressure to 7-8 mmHg reduces post-operative shoulder tip discomfort significantly in terms of both frequency and intensity, reduces the need for post-operative analgesics, and shortens hospital stays following surgery in the low-pressure group compared to the standard pressure group. The p-value of o.o5 indicated statistical significance.

The LS group consistently had higher pain scores at time 3 hours (4.19 ± 0.87) with p=0.001, at time 6 hours (2.45 ± 0.89) with p=0.001, at time 12

hours (1.16 ± 0.73) with p=0.001, and at time 24 hours (0.90 ± 0.65) with p=0.001, according to our examination of postoperative pain scores using a visual analog scale (VAS). This result is consistent with the research by **Iam et al.**[20], whose work showed that one of the prognostic indicators for a longer hospital stay was a post-operative pain level of greater than 3.

Another predictor of a prolonged hospital stay was the use of oral analgesia, which indicated the level of postoperative pain and particularly the need for more than two doses of oral analgesia (p=0.001). A post-operative pain level of more than three was the reason for a longer stay in the hospital in 78.65% (70/89) of the patients in the prolonged hospital stay group. Our research advances this understanding by offering a thorough temporal picture of postoperative pain and its correlation with hospital stay duration.

When it came to laboratory data, the LS group had **serum creatinine** levels that were much higher (0.94 ± 0.44 mg/dL) than those in the SS group (0.73 ± 0.17 mg/dL), having a **p-value of 0.008.** The two groups' differences in this one laboratory metric were statistically significant. This discovery broadens the range of information regarding the factors that may contribute to an extended hospital stay after a laparoscopic cholecystectomy. Although it is unclear if elevated creatinine levels cause longer hospital stays, we speculate that they might be a sign of comorbid conditions or problems with perioperative fluid management that could hinder recovery. Preoperative renal insufficiency was found to be an independent risk factor for unfavorable outcomes in noncardiac surgery by **Kheterpal et al.** [45], which is consistent with the present findings. By extending this idea to laparoscopic cholecystectomy specifically, our research raises the possibility that preoperative renal function might have a significant role in determining the outcome of the procedure.

Hb levels had no significant effect on either group in our investigation. On the other hand, a study by **BUTT et al.** [46] reported that the levels of liver enzymes and hematological markers had changed significantly. In order to prevent additional problems and morbidity, care must be made to prevent these parameters from declining to harmful levels.

In comparison to the SS group (8.61 ± 2.90 per µL), the LS group had a substantially greater average TLC (1475.02 ± 8165.87 per µL). **Singh CG. et al**[47] stated that TLC values more than 10,000/mm3 were linked to difficult LC and were found to be statistically significant (p 10,000/mm3 had a 31.6% sensitivity, 99.3% specificity, and 85.7% positive predictive value (PPV) as a predictor of difficult LC. Increased TLC values could be the result of persistent inflammation, which would make LC challenging and lengthen the recovery period after surgery.

No statistically significant differences were observed in platelet count, blood urea, fasting blood sugar, and PT/INRbetween the two groups.

Our findings revealed that there was no significant difference between the long stay and short stay groups, while **Agrawal et al.**[48] reported that there was a substantial rise in the levels of bilirubin in the delayed group, which might suggest a longer hospital stay.

In line with the findings of **Agrawal et al.'s** work [48], which also showed no statistically significant levels for SGOT and SGPT, our results did not show significance regarding these levels. This suggests that the observed variance may be the result of variability rather than a true clinical difference, which would explain why there was no effect on the length of hospitalization.

Our study's strength is its thorough examination of the pre-, intra-, and postoperative variables affecting the length of stay after laparoscopic cholecystectomy. We have offered an all-encompassing perspective on

the factors that influence the length of hospital stays by looking at a variety of variables. By identifying both known and unknown characteristics linked to extended hospital stays, our findings add to the body of knowledge and provide important new information for enhancing healthcare for patients and resource management.

Our results have important significance for future research as well as therapeutic practice. Prior to surgery, identifying factors that increase the risk of a longer hospital stay—like adhesions, difficult dissection of Calot's triangle, intraoperative gall bladder rupture, postoperative complications like nausea, vomiting, and urinary retention, high creatinine levels, and post-operative Pain score (VAS Score) —can help with resource allocation and patient counseling. Higher-risk cases could be scheduled prior in the day or week by surgeons to allow for longer observation if necessary. Furthermore, as recommended by **Carli and Scheede-Bergdahl**[49], these patients might gain from improved preoperative optimization, which includes targeted measures to address modifiable risk factors.

LIMITATIONS

- Although the relatively small sample size was sufficient to identify several significant associations, it may have limited our ability to detect more subtle relationships between variables.
- Our findings might not be as applicable in other hospital environments with distinct patient demographics or surgical procedures due to the single-center design.

SUMMARY AND CONCLUSION

To sum up, our research has revealed a variety of preoperative, intraoperative, and postoperative variables linked to an extended hospital stay after elective laparoscopic cholecystectomy. These results have important implications for surgical technique, hospital administration, and patient care. In managing patients undergoing laparoscopic cholecystectomy, healthcare practitioners may be able to improve patient outcomes, increase recovery, and optimize resource consumption by addressing these aspects through targeted treatments and enhanced perioperative protocols. Our knowledge of the factors that influence hospital stays is still developing, which brings us one step closer to our objective of offering effective, high-quality care that strikes a balance between patients' needs and the realities of limited healthcare resources.

Prospective, multicenter studies should be part of future research efforts to confirm the findings and investigate other factors that can affect length of stay.

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Case No.	MRD No.	NAME	AGE	AGE GROUP	SEX	D.O.A	D.O.S	D.O.D	DIAGNOSIS	CHIEF COMPLAINT	P/A FINDINGS
1	1644192	SB	32	2	F	27-12-23	28-12-23	29-12-23	Acute calculus cholecystitis	Pain Abdomen	Soft
2	1644511	RK	70	5	F	27-12-23	28-12-23	29-12-23	Cholelithiasis	Elective	Soft
3	1642867	Sk	66	5	F	23-12-23	28-12-23	31-12-23	Acute gangrenous complicated cholecystitis	Pain Abdomen	Tenderness
4	1642339	Mk	23	1	F	21-12-23	22-12-23	24-12-23	Cholelithiasis	Pain Abdomen With Constipation	Tenderness
5	1639587	Rr	52	4	F	21-12-23	22-12-23	24-12-24	Cholelithiasis	Elective	Soft
6	1641765	Sk	58	4	F	20-12-23	21-12-23	26-12-23	Xanthogranulomatous cholecystitis	Elective	Soft
7	1064564	Hs	33	2	M	19-12-23	19-12-23	21-12-23	Cholelithiasis	Pain Abdomen	Tenderness
8	1286084	P	30	1	F	20-12-23	21-12-23	22-12-23	Cholelithiasis	Pain Abdomen	Soft
9	1642193	S	49	3	F	21-12-23	22-12-23	24-12-23	Cholelithiasis	Pain Abdomen	Soft
10	1022207	S	38	2	F	28-12-23	30-12-23	31-12-23	Cholelithiasis	Elective	Soft
11	1073	Db	48	3	F	14-03-24	14-03-24	16-03-24	symptomatic gall stone disease	Bloating And Pain Abdomen	Soft
12	423793	Sb	63	5	F	13-03-24	14-03-24	16-03-24	cholelithiasis	Pain Abdomen	Soft
13	280133	V	35	2	M	14-03-24	15-03-24	16-03-24	Cholelithiasis	Pain Abdomen, Vomiting	Tenderness
14	1692542	Ik	51	4	F	13-03-24	14-03-24	16-03-24	Symptomatic gallstone disease	Pain Abdomen	Soft
15	1620330	Ps	43	3	F	13-03-24	15-03-24	16-03-24	Cholelithiasis	Pain Abdomen	Soft
16	1695022	A	28	1	F	17-03-24	18-03-24	19-03-24	Symptomatic gall stone disease	Pain Abdomen	Tenderness
17	1694188	NB	48	3	F	18-03-24	19-03-24	20-03-24	Cholelithiasis	Elective	Soft
18	1429685	KK	45	3	F	17-03-24	19-03-24	20-03-24	Symptomatic gall stone disease	Pain Abdomen, Vomiting	Tenderness
19	1692123	MS	56	4	M	19-03-24	20-03-24	22-03-24	Symptomatic gall stone disease	Elective	Soft
20	1476762	Kn	69	5	M	18-03-24	21-03-24	22-03-24	Cholelithiasis	Pain Abdomen, Vomiting	Soft
21	1696320	Sk	66	5	F	18-03-24	20-03-24	22-03-24	Acute calculus cholecystitis	Pain Abdomen	Tenderness
22	239056	MA	57	4	F	28-03-24	29-03-24	31-03-24	Acute calculus cholecystitis	Pain Abdomen	Soft
23	1702984	MD	52	4	F	28-03-24	29-03-24	31-03-24	Symptomatic gall stone disease	Pain Abdomen, Vomiting	Tenderness
24	1577663	Ns	37	2	M	19-03-24	20-03-24	22-03-24	Cholelithiasis	Elective	Soft
25	1701805	PK	36	2	F	27-03-24	30-03-24	01-04-24	Acute calculus cholecystitis	Pain Abdomen	Soft
26	1619367	Bc	47	3	F	03-04-24	03-04-34	05-04-24	Cholelithiasis	Pain Abdomen	Soft
27	1706543	Rv	37	2	F	02-03-24	03-04-24	04-04-24	Cholelithiasis	Pain Abdomen	Soft
28	1228821	Dl	23	1	M	03-04-24	03-04-24	05-04-24	Symptomatic gall stone disease	Pain Abdomen, Vomiting	Soft
29	1724822	As	28	1	M	03-05-24	04-05-25	05-05-24	Symptomatic gall stone disease	Pain Abdomen	Soft
30	1392182	Sk	48	3	F	27-04-24	29-04-24	30-04-24	Acute calculus cholecystitis	Pain Abdomen	Tenderness
31	1718890	Ar	60	4	F	06-05-24	07-05-34	09-05-24	Symptomatic gall stone disease	Elective	Soft
32	1228819	Ds	23	1	M	03-04-24	03-04-24	04-04-24	symptomatic gall stone disease	Pain Abdomen	Soft
33	1715968	Mk	28	1	F	23-04-24	24-04-24	25-04-24	Symptomatic gall stone disease	Pain Abdomen	Soft
34	737978	Rr	41	3	M	20-04-24	22-04-24	23-04-24	Symptomatic gall stone disease	Pain Abdomen	Soft
35	308421	Is	64	5	M	21-04-24	22-04-24	25-04-24	Empyema gall bladder with gall bladder stone	Pain Abdomen	Tenderness
36	1322157	Pk	69	5	M	22-04-24	23-04-24	24-04-24	Acute calculus cholecystitis	Pain Abdomen	Tenderness

Case No.	MRD No.	HAEMOGLOBIN	TLC	PLT COUNT	S. CREATININE	BLOOD UREA	FBS	S. BILIRUBIN (T)	S. BILIRUBIN (D)	SGOT	SGPT	ALP	PTI	INR	VIRAL MARKERS
1	1644192	10.8	7.6	279	0.6	25	137	0.26	0.14	24	39	78	12	0.79	NR
2	1644511	11.6	12.5	220	0.88	22	128	0.46	0.06	27	15	128	10	0.92	NR
3	1642867	9.9	18.9	268	0.73	68	90	2.63	1.38	34	79	553	13.7	1.25	NR
4	1642339	9.8	6.8	282	0.36	12	104	1.84	1.07	75	94	426	12.1	1.11	NR
5	1639587	10.3	10.2	130	0.65	43	112	0.51	0.11	45	39	122	10.8	0.65	NR
6	1641765	12.8	8.6	152	0.54	12	97	12	0.24	28	24	84	12.5	1.15	NR
7	1064564	15.5	6.67	311	0.91	16	102	1	0.7	37	33	102	11.5	1.05	NR
8	1286084	11.6	5.6	260	0.48	19	104	0.37	0.02	36	33	104	12	1.1	NR
9	1642193	13.6	8.4	286	0.68	33	110	0.66	0.11	40	74	164	10.4	0.95	NR
10	1022207	13.4	8.6	234	0.66	28	98	0.65	0.23	32	42	114	11.4	1.05	NR
11	1073	12.3	7.7	282	0.68	21	88	0.41	0.17	12	13	87	11.7	1.07	NR
12	423793	8.4	8.6	351	1.3	49	104	0.16	0.1	16	16	71	11	1.01	NR
13	280133	13.1	7	142	0.83	30	110	0.33	0.15	14	27	97	11.7	1.07	NR
14	1692542	12	14	173	0.76	34	178	0.32	0.2	58	60	144	11.8	1.08	NR
15	1620330	11	5.9	200	0.59	20	104	0.22	0.11	19	23	110	10.9	1	NR
16	1695022	12	7.1	262	0.54	31	90	0.23	0.11	14	16	128	13.8	1.26	NR
17	1694188	10.8	6.49	266	0.76	21	102	0.7	0.35	14	12	100	12.9	1.18	NR
18	1429685	11.3	19	658	0.61	18	81	0.41	0.21	17	20	70	11.5	1.05	NR
19	1692123	13.1	7.3	180	0.84	24	110	0.49	0.21	45	57	73	10.5	0.96	NR
20	1476762	12.8	6.7	90	0.79	29	90	1.11	0.4	31	30	59	12.3	1.13	NR
21	1696320	10.2	10.3	227	0.49	24	103	0.65	0.28	24	29	74	12.5	0.49	NR
22	239056	13.4	9.6	188	0.75	19	90	0.28	0.15	11	12	64	12.7	1.16	NR
23	1702984	12.4	11.6	314	0.97	30	88	0.58	0.23	38	97	174	11.8	0.97	NR
24	1577663	13.1	6.7	120	0.69	22	80	1.34	0.54	36	48	115	13.2	1.21	NR
25	1701805	11.4	6.3	150	0.66	17	102	0.72	0.27	12	9	84	11.1	1.02	NR
26	1619367	8	3.67	296	0.75	20	96	0.41	0.19	21	16	179	11.5	0.95	NR
27	1706543	13.9	12.33	308	0.61	14	122	0.64	0.11	22	20	74	12.2	1.12	NR
28	1228821	13.7	5.25	276	0.79	10	94	0.29	0.15	29	49	420	12.4	1.14	NR
29	1724822	13.6	5.4	241	0.93	16	96	1.28	0.39	22	21	92	11.5	1.05	NR
30	1392182	11.4	10	232	0.72	22	98	0.12	0.23	14	20	102	11.2	1.03	NR
31	1718890	10.6	8.03	391	1.14	32	102	0.2	0.11	17	22	156	11.8	1.08	NR
32	1228819	14.5	11.9	290	0.72	26	92	0.53	0.21	30	26	120	11	1.03	NR
33	1715968	9.4	5.9	157	0.7	26	86	0.5	0.1	14	11	95	12.1	1.05	NR
34	737978	8.5	9.5	175	0.71	34	114	0.23	0.14	15	10	69	12	1.1	NR
35	308421	10.8	12.7	481	0.9	29	104	0.34	0.07	16	10	123	11.2	1.03	NR
36	1322157	14	8.2	207	1.23	23	110	0.6	0.21	17	10	105	12.3	1.13	NR

Case No.	MRD No.	USG Parameters_GB WALL THICKNESS	Multiple or single calculi	PERICYSTIC FLUID COLLECTION	CBD DIAMETER	INTRA OP_EMPYEMA	GANGRENE	ADHESIONS	GB WALL	DISSECTION OF CALOTS	Other FINDINGS
1	1644192	Normal	Multiple	Absent	Normal	Absent	Absent	Absent	Normal	Easy	Absent
2	1644511	Normal	Multiple	Absent	Normal	Absent	Absent	Present	Thickened	Easy	Absent
3	1642867	Thickened	Multiple	Absent	Normal	Present	Present	Present	Thickened	Difficult	Absent
4	1642339	Normal	Single	Present	Normal	Absent	Absent	Absent	Normal	Easy	Absent
5	1639587	Normal	Multiple	Absent	Normal	Absent	Absent	Absent	Normal	Easy	Absent
6	1641765	Thickened	Multiple	Present	Normal	Present	Present	Present	Thickened	Difficult	Pus collection at Gb fossa
7	1064564	Normal	Single	Absent	Normal	Absent	Absent	Present	Normal	Difficult	Absent
8	1286084	Normal	Multiple	Absent	Normal	Absent	Absent	Present	Normal	Easy	Absent
9	1642193	Normal	Multiple	Absent	Normal	Absent	Absent	Absent	Normal	Easy	Absent
10	1022207	Normal	Multiple	Absent	Normal	Absent	Absent	Absent	Normal	Easy	Absent
11	1073	Normal	Multiple	Absent	Normal	Absent	Absent	Absent	Normal	Easy	Absent
12	423793	Normal	Single	Absent	Normal	Absent	Absent	Absent	Normal	Easy	Absent
13	280133	Normal	Multiple	Absent	Normal	Absent	Absent	Absent	Normal	Easy	Absent
14	1692542	Normal	Single	Absent	Normal	Absent	Absent	Absent	Normal	Easy	Absent
15	1620330	Normal	Multiple	Absent	Normal	Absent	Absent	Absent	Normal	Easy	Absent
16	1695022	Normal	Multiple	Absent	Normal	Absent	Absent	Absent	Normal	Easy	Absent
17	1694188	Thickened	Multiple	Absent	Normal	Absent	Absent	Absent	Normal	Easy	Absent
18	1429685	Normal	sludge	Absent	Dilated	Absent	Absent	Absent	Normal	Easy	Absent
19	1692123	Normal	Multiple	Absent	Normal	Absent	Absent	Present	Normal	Easy	Absent
20	1476762	Normal	Single	Absent	Normal	Absent	Absent	Absent	Normal	Easy	Absent
21	1696320	Normal	Multiple	Absent	Normal	Absent	Absent	Absent	Thickened	Easy	Absent
22	239056	Normal	Multiple	Absent	Dilated	Absent	Absent	Present	Normal	Easy	Absent
23	1702984	Thickened	Multiple	Absent	Normal	Absent	Absent	Present	Normal	Difficult	Absent
24	1577663	Normal	Single	Absent	Normal	Absent	Absent	Absent	Normal	Easy	Absent
25	1701805	Thickened	Single	Absent	Normal	Absent	Absent	Present	Normal	Difficult	Absent
26	1619367	Normal	Single	Absent	Normal	Absent	Absent	Absent	Normal	Easy	Absent
27	1706543	Normal	Multiple	Absent	Normal	Absent	Absent	Present	Normal	Easy	Absent
28	1228821	Normal	Multiple	Absent	Normal	Absent	Absent	Absent	Normal	Easy	Absent
29	1724822	Normal	Multiple	Absent	Normal	Absent	Absent	Absent	Normal	Easy	Absent
30	1392182	Thickened	Multiple	Absent	Normal	Absent	Absent	Present	Normal	Easy	Absent
31	1718890	Thickened	Multiple	Absent	Normal	Present	Absent	Present	Thickened	Difficult	Absent
32	1228819	Normal	Multiple	Absent	Normal	Absent	Absent	Absent	Normal	Easy	Absent
33	1715968	Thickened	Multiple	Absent	Normal	Absent	Absent	Absent	Normal	Easy	Absent
34	737978	Normal	Multiple	Absent	Normal	Absent	Absent	Absent	Normal	Easy	Absent
35	308421	Thickened	Multiple	Present	Normal	Present	Absent	Present	Normal	Easy	Absent
36	1322157	Thickened	Multiple	Absent	Normal	Absent	Absent	Present	Thickened	Difficult	Absent

Case No.	MRD No.	INTRA OP_GB RUPTURE	GB BED HEMORHHAGE	Cystic artery hemorhhage	CBD INJURY	DUODENAL INJURY	OTHER ORGAN INJURY	STONE SPILLAGE	OTHER	Post OP COMPLICATIONS_HEMORHHAGE	BILE LEAK	CBD INJURY
1	1644192	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
2	1644511	Present	Absent	Absent	Absent	Absent	Absent	Present	Absent	Absent	Absent	Absent
3	1642867	Present	Present	Absent	Absent	Absent	Absent	Present	Absent	Absent	Absent	Absent
4	1642339	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
5	1639587	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
6	1641765	Present	Present	Absent	Absent	Absent	Absent	Present	Absent	Absent	Absent	Absent
7	1064564	Absent	Absent	Absent	Absent	Absent	Absent	Present	Absent	Absent	Absent	Absent
8	1286084	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
9	1642193	Present	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Present	Absent	Absent
10	1022207	Present	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
11	1073	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
12	423793	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
13	280133	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Present	Absent	Absent
14	1692542	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
15	1620330	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
16	1695022	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
17	1694188	Absent	Present	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
18	1429685	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
19	1692123	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
20	1476762	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
21	1696320	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
22	239056	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
23	1702984	Present	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
24	1577663	Present	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
25	1701805	Present	Present	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
26	1619367	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
27	1706543	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
28	1228821	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
29	1724822	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
30	1392182	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
31	1718890	Present	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
32	1228819	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
33	1715968	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
34	737978	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
35	308421	Present	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
36	1322157	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent

Case No.	MRD No.	PARALYTIC ILEUS	SSI	VAS SCORE@ 3hrs	VAS SCORE@ 6hrs	VAS SCORE@ 12hrs	VAS SCORE@ 24 hrs	Abdominal Distension	Nausea/Vomiting	Icterus	URINARY RETENTION	SHOULDER PAIN	POST OP HOSPITAL STAY	-
1	1644192	Absent	Absent	4	2	0	0	Absent	Absent	Absent	Absent	Absent	24hours	1
2	1644511	Absent	Absent	4	2	0	0	Absent	Absent	Absent	Absent	Absent	24hours	1
3	1642867	Absent	Absent	4	2	0	0	Absent	Present	Absent	Absent	Absent	72hours	2
4	1642339	Present	Absent	3	1	0	0	Absent	Absent	Absent	Absent	Absent	24hours	1
5	1639587	Absent	Absent	3	1	0	0	Absent	Absent	Absent	Absent	Absent	24hours	1
6	1641765	Absent	Absent	3	2	1	0	Absent	Absent	Absent	Absent	Absent	24hours	1
7	1064564	Absent	Absent	5	3	1	1	Absent	Absent	Absent	Absent	Absent	48hours	2
8	1286084	Absent	Absent	3	1	0	0	Absent	Absent	Absent	Absent	Absent	24hours	1
9	1642193	Absent	Absent	4	2	1	1	Absent	Absent	Absent	Absent	Absent	48hours	2
10	1022207	Absent	Absent	3	1	0	0	Absent	Absent	Absent	Absent	Absent	24hours	1
11	1073	Absent	Absent	4	2	1	0	Absent	Absent	Absent	Absent	Absent	48hours	2
12	423793	Absent	Absent	4	3	1	1	Absent	Absent	Absent	Absent	Absent	48hours	2
13	280133	Absent	Absent	2	0	0	0	Absent	Absent	Absent	Absent	Absent	24hours	1
14	1692542	Absent	Absent	5	3	3	1	Absent	Present	Absent	Absent	Absent	48hours	2
15	1620330	Absent	Absent	2	1	0	0	Absent	Absent	Absent	Absent	Absent	24hours	1
16	1695022	Absent	Absent	3	0	1	0	Absent	Absent	Absent	Absent	Absent	24hours	1
17	1694188	Absent	Absent	3	1	0	0	Absent	Absent	Absent	Absent	Absent	24hours	1
18	1429685	Absent	Absent	4	3	2	0	Absent	Absent	Absent	Present	Absent	24hours	1
19	1692123	Absent	Absent	4	2	1	0	Absent	Absent	Absent	Present	Absent	48hours	2
20	1476762	Absent	Absent	2	0	1	0	Absent	Absent	Absent	Absent	Absent	24hours	1
21	1696320	Absent	Absent	3	2	1	1	Absent	Absent	Absent	Absent	Absent	48hours	2
22	239056	Absent	Absent	4	3	2	2	Absent	Absent	Absent	Absent	Present	48hours	2
23	1702984	Absent	Absent	5	4	2	1	Absent	Absent	Absent	Absent	Absent	48hours	2
24	1577663	Absent	Absent	4	2	1	1	Absent	Absent	Absent	Absent	Absent	48hours	2
25	1701805	Absent	Absent	5	3	1	2	Absent	Absent	Absent	Absent	Present	48hours	2
26	1619367	Absent	Absent	5	2	1	0	Absent	Absent	Absent	Absent	Present	48hours	2
27	1706543	Absent	Absent	2	0	0	0	Absent	Absent	Absent	Absent	Absent	24hours	1
28	1228821	Absent	Absent	4	3	2	1	Absent	Absent	Absent	Absent	Present	48hours	2
29	1724822	Absent	Absent	2	0	0	0	Absent	Absent	Absent	Absent	Absent	24hours	1
30	1392182	Absent	Absent	3	2	1	0	Absent	Absent	Absent	Absent	Absent	24hours	1
31	1718890	Absent	Absent	4	3	1	1	Absent	Present	Absent	Absent	Absent	48hours	2
32	1228819	Absent	Absent	2	0	0	0	Absent	Absent	Absent	Absent	Absent	24hours	1
33	1715968	Absent	Absent	2	1	1	0	Absent	Absent	Absent	Absent	Absent	24hours	1
34	737978	Absent	Absent	2	1	0	0	Absent	Absent	Absent	Absent	Absent	24hours	1
35	308421	Absent	Absent	5	4	2	2	Absent	Present	Absent	Present	Absent	72hours	2
36	1322157	Absent	Absent	3	1	0	0	Absent	Absent	Absent	Absent	Absent	24hours	1

Case No.	MRD No.	NAME	AGE	AGE GROUP	SEX	D.O.A	D.O.S	D.O.D	DIAGNOSIS	CHIEF COMPLAINT	P/A FINDINGS
37	1717367	M	42	3	M	22-04-24	22-04-24	23-04-24	Symptomatic gall stone disease	Pain Abdomen	Soft
38	1714960	A	25	1	F	16-04-24	16-04-24	17-04-24	Gb polyp with cholethiasis	Pain Abdomen	Soft
39	1732895	Rj	53	4	M	15-05-24	16-05-24	18-05-24	Symptomatic gall stone disease	Pain Abdomen	Soft
40	1710007	Sr	72	5	M	20-05-24	21-05-24	22-0524	Cholelithiasis	Elective	Soft
41	1738641	A	55	4	F	22-05-24	23-05-24	25-05-24	Symptomatic gall stone disease	Elective	Soft
42	1341116	Ck	36	2	F	25-05-24	25-05-25	27-05-24	Symptomatic gall stone disease	Pain Abdomen	Soft
43	1738874	Sb	50	3	F	22-05-24	24-05-24	26-05-24	Acute calculus cholecystitis	Pain Abdomen	Tenderness
44	1702277	SR	38	2	M	24-05-24	25-05-24	26-05-24	symptomatic gall stone disease	Pain Abdomen	Tenderness
45	1739918	Sm	29	1	F	24-05-24	24-05-24	26-05-24	Symptomatic gall stone disease	Elective	Soft
46	1739717	SB	37	2	F	24-05-24	25-05-24	27-05-24	Symptomatic gall stone disease	Pain Abdomen	Soft
47	1735316	MW	72	5	M	19-05-24	25-05-24	28-05-24	Chronic calculus cholecystitis	Pain Abdomen	Tenderness
48	1739871	S	40	2	F	25-05-34	25-05-24	27-05-24	Symptomatic gall stone disease	Pain Abdomen	Soft
49	1735832	Sl	44	3	F	26-05-24	27-05-24	30-05-24	symptomatic gall stone disease	Pain Abdomen	Tenderness
50	1755243	RD	40	2	M	26-05-24	27-05-24	28-05-24	Symptomatic gall stone disease	Elective	Soft
51	1741321	MR	26	1	F	26-05-25	27-05-24	28-04-24	Symptomatic gall stone disease	Pain Abdomen	Soft
52	1740341	Sk	60	4	F	26-05-24	27-05-24	28-05-24	Symptomatic gall stone disease	Pain Abdomen	Soft
53	1666375	GG	44	3	F	23-05-24	24-05-24	27-05-24	Acute calculus cholecystitis	Pain Abdomen	Tenderness
54	1715529	Nk	48	3	M	24-05-24	25-05-24	29-05-24	Acute calculus cholecystitis	Pain Abdomen	Tenderness
55	1844143	Nk	32	2	M	28-05-24	28-05-24	29-05-24	Symptomatic gall stone disease	Pain Abdomen	Soft
56	1396097	Pk	64	5	F	27-05-24	28-05-24	30-05-24	Symptomatic gall stone disease	Elective	Soft
57	1356116	Ss	72	5	M	27-05-24	28-05-24	29-05-24	cholelithiasis	Elective	Soft
58	1741672	Sk	66	5	F	28-05-24	28-05-24	29-05-24	Symptomatic gall stone disease	Pain Abdomen	Soft
59	985792	Nd	65	5	F	28-05-24	28-05-24	30-05-24	Mucocele GB	Pain Abdomen	Tenderness
60	1744023	VJ	44	3	M	31-05-24	31-05-24	31-05-24	Symptomatic gall stone disease	Elective	Soft
61	891799	TR	71	5	M	28-05-24	28-05-24	30-05-24	Symptomatic gall stone disease	Elective	Soft
62	1739780	SS	72	5	M	24-05-24	25-05-24	27-05-24	Symptomatic gall stone disease	Elective	Soft

Case No.	MRD No.	HAEMOGLOBIN	TLC	PLT COUNT	S. CREATININE	BLOOD UREA	FBS	S. BILIRUBIN (T)	S. BILIRUBIN (D)	SGOT	SGPT	ALP	PTI	INR	VIRAL MARKERS
37	1717367	14.4	10.6	270	0.71	26	90	0.71	0.23	26	15	104	13.1	1.26	NR
38	1714960	13.7	8.1	281	0.81	25	92	0.5	0.11	32	45	75	11.7	1.07	NR
39	1732895	13.4	6.91	180	1.11	36	126	0.44	0.08	21	20	61	11.5	1.05	NR
40	1710007	12.3	4.1	156	1.04	20	90	0.21	0.3	22	24	102	11.3	1.04	NR
41	1738641	9.7	13.5	187	1.15	59	104	0.35	0.14	23	15	118	11.8	1.08	NR
42	1341116	12.8	6.7	378	0.72	14	90	1.15	0.39	22	27	76	11.5	1.05	NR
43	1738874	13.2	6.7	241	0.74	27	102	0.88	0.19	38	20	109	14.5	1.33	NR
44	1702277	13.1	8	221	0.72	25	114	0.44	0.19	28	34	79	11.2	1.03	NR
45	1739918	12	7.3	219	1.01	20	96	0.12	0.75	17	22	95	11	0.79	NR
46	1739717	12	7.7	160	0.56	30	106	0.48	0.08	17	14	65	11.5	1.05	NR
47	1735316	10.7	13.6	234	1	33	76	0.99	0.38	18	25	88	12.2	1.12	NR
48	1739871	13.1	8.1	231	0.61	23	102	0.4	0.08	26	30	111	10.7	0.98	NR
49	1735832	12.9	9.61	317	1.8	22	82	1.45	0.27	22	19	115	11.8	1.08	NR
50	1755243	13.7	8.8	239	0.85	44	79	0.43	0.08	52	89	105	10.4	0.95	NR
51	1741321	13.4	8	130	0.9	26	102	1.3	0.3	17	23	257	11	1.02	NR
52	1740341	12	10.3	228	0.69	31	110	0.56	0.1	29	42	68	10.9	1	NR
53	1666375	11	5.77	349	0.78	22	85	0.62	0.09	28	34	61	11.1	1.02	NR
54	1715529	14.7	3.1	130	0.95	19	110	1.91	0.62	19	23	66	12.6	1.15	NR
55	1844143	13.2	5.6	228	0.59	13	89	1.16	0.4	26	31	98	13.5	0.59	NR
56	1396097	9.2	7.1	193	2.89	75	126	0.18	0.07	12	10	120	11.1	1.02	NR
57	1356116	11	7.99	183	0.85	29	112	0.41	0.08	22	14	51	11.2	1.03	NR
58	1741672	11.8	8.27	379	0.72	13	90	0.18	0.48	21	24	110	11.3	1.02	NR
59	985792	11	5.26	211	0.79	15	85	0.21	0.31	16	21	104	12.1	1.03	NR
60	1744023	13.5	11.8	314	0.9	35	92	1.46	0.25	23	36	94	11.3	1.04	NR
61	891799	9.4	7. 1	232	1.08	18	96	0.31	0.08	29	13	96	11.8	1.08	NR
62	1739780	10.7	4.4	152	0.96	23	114	0.18	0.45	85	43	163	13.1	1.2	NR

Case No.	MRD No.	USG Parameters_GB WALL THICKNESS	Multiple or single calculi	PERICYSTIC FLUID COLLECTION	CBD DIAMETER	INTRA OP_EMPYEMA	GANGRENE	ADHESIONS	GB WALL	DISSECTION OF CALOTS	Other FINDINGS
37	1717367	Thickened	Single	Absent	Normal	Absent	Absent	Present	Normal	Easy	Absent
38	1714960	Normal	Multiple	Absent	Normal	Absent	Absent	Present	Normal	Easy	Absent
39	1732895	Normal	Multiple	Absent	Normal	Absent	Absent	Absent	Normal	Easy	Absent
40	1710007	Normal	Multiple	Absent	Normal	Absent	Absent	Absent	Normal	Easy	Absent
41	1738641	Normal	Multiple	Absent	Normal	Absent	Absent	Absent	Normal	Easy	Absent
42	1341116	Thickened	Multiple	Absent	Normal	Absent	Absent	Present	Normal	Easy	Absent
43	1738874	Thickened	Multiple	Absent	Normal	Absent	Absent	Present	Thickened	Difficult	Absent
44	1702277	Normal	Multiple	Absent	Normal	Absent	Absent	Present	Normal	Easy	Absent
45	1739918	Normal	Multiple	Absent	Normal	Absent	Absent	Absent	Normal	Easy	Absent
46	1739717	Normal	Multiple	Absent	Normal	Absent	Absent	Absent	Normal	Easy	Absent
47	1735316	Thickened	Multiple	Absent	Normal	Present	Present	Present	Thickened	Difficult	Absent
48	1739871	Normal	Multiple	Absent	Normal	Absent	Absent	Absent	Normal	Easy	Absent
49	1735832	Thickened	Multiple	Absent	Normal	Absent	Absent	Present	Thickened	Difficult	T colon adhered to gb
50	1755243	Normal	Multiple	Absent	Normal	Absent	Absent	Absent	Normal	Easy	Absent
51	1741321	Normal	Polyp	Absent	Normal	Absent	Absent	Absent	Normal	Easy	Absent
52	1740341	Normal	Multiple	Absent	Normal	Absent	Absent	Absent	Normal	Easy	Absent
53	1666375	Normal	Multiple	Absent	Normal	Absent	Absent	Present	Normal	Easy	Absent
54	1715529	Thickened	Multiple	Absent	Normal	Absent	Absent	Present	Thickened	Difficult	Absent
55	1844143	Normal	Multiple	Absent	Normal	Absent	Absent	Absent	Normal	Easy	Absent
56	1396097	Thickened	Multiple	Absent	Normal	Absent	Absent	Present	Thickened	Difficult	Absent
57	1356116	Normal	Multiple	Absent	Normal	Absent	Absent	Absent	Normal	Easy	Absent
58	1741672	Normal	Multiple	Absent	Normal	Absent	Absent	Absent	Normal	Easy	Absent
59	985792	Thickened	Normal	Absent	Normal	Absent	Absent	Present	Thickened	Difficult	Absent
60	1744023	Normal	Multiple	Absent	Normal	Absent	Absent	Absent	Normal	Easy	Absent
61	891799	Normal	Single	Absent	Normal	Absent	Absent	Present	Normal	Difficult	Absent
62	1739780	Normal	Multiple	Absent	Normal	Absent	Absent	Absent	Normal	Easy	Absent

Case No.	MRD No.	INTRA OP_GB RUPTURE	GB BED HEMORHHAGE	Cystic artery hemorhhage	CBD INJURY	DUODENAL INJURY	OTHER ORGAN INJURY	STONE SPILLAGE	OTHER	Post OP COMPLICATIONS_HEMORHHAGE	BILE LEAK	CBD INJURY
37	1717367	Present	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
38	1714960	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
39	1732895	Present	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
40	1710007	Absent	Present	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
41	1738641	Absent	Present	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
42	1341116	Present	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
43	1738874	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
44	1702277	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
45	1739918	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
46	1739717	Present	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
47	1735316	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
48	1739871	Present	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
49	1735832	Absent	Present	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
50	1755243	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
51	1741321	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
52	1740341	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
53	1666375	Present	Present	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
54	1715529	Present	Present	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
55	1844143	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
56	1396097	Present	Present	Absent	Absent	Absent	Absent	Present	Absent	Absent	Absent	Absent
57	1356116	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
58	1741672	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
59	985792	Present	Present	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
60	1744023	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
61	891799	Present	Present	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
62	1739780	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent

Case No.	MRD No.	PARALYTIC ILEUS	SSI	VAS SCORE@ 3hrs	VAS SCORE@ 6hrs	VAS SCORE@ 12hrs	VAS SCORE@ 24 hrs	Abdominal Distension	Nausea/Vomiting	Icterus	URINARY RETENTION	SHOULDER PAIN	POST OP HOSPITAL STAY	-
37	1717367	Absent	Absent	3	1	0	0	Absent	Absent	Absent	Absent	Absent	24hours	1
38	1714960	Absent	Absent	2	1	1	0	Absent	Absent	Absent	Absent	Absent	24hours	1
39	1732895	Absent	Absent	3	3	1	0	Absent	Absent	Absent	Present	Absent	48hours	2
40	1710007	Absent	Absent	2	1	0	0	Absent	Absent	Absent	Absent	Absent	24hours	1
41	1738641	Absent	Absent	4	2	0	0	Absent	Absent	Absent	Present	Absent	48hours	2
42	1341116	Absent	Absent	4	3	1	1	Absent	Absent	Absent	Absent	Absent	48hours	2
43	1738874	Present	Absent	5	4	2	0	Absent	Present	Absent	Absent	Absent	48hours	2
44	1702277	Absent	Absent	2	0	0	0	Absent	Absent	Absent	Absent	Absent	24hours	1
45	1739918	Absent	Absent	4	2	1	1	Absent	Present	Absent	Present	Absent	48hours	2
46	1739717	Absent	Absent	3	2	0	1	Absent	Absent	Absent	Present	Absent	48hours	2
47	1735316	Absent	Absent	6	3	1	1	Absent	Present	Absent	Present	Absent	72hours	2
48	1739871	Absent	Absent	3	0	0	0	Absent	Absent	Absent	Present	Absent	48hours	2
49	1735832	Present	Absent	6	3	2	2	Absent	Present	Absent	Absent	Absent	72hours	2
50	1755243	Absent	Absent	2	0	0	0	Absent	Absent	Absent	Absent	Absent	24hours	1
51	1741321	Absent	Absent	2	1	1	0	Absent	Absent	Absent	Present	Absent	24hours	1
52	1740341	Absent	Absent	3	2	0	0	Absent	Absent	Absent	Absent	Absent	24hours	1
53	1666375	Absent	Absent	5	3	2	1	Absent	Absent	Absent	Absent	Absent	72hours	2
54	1715529	Absent	Absent	4	2	2	2	Absent	Present	Absent	Present	Present	96hours	2
55	1844143	Absent	Absent	3	1	0	0	Absent	Absent	Absent	Absent	Absent	24hours	1
56	1396097	Absent	Absent	4	2	1	1	Absent	Absent	Absent	Absent	Absent	48hours	2
57	1356116	Absent	Absent	3	1	1	0	Absent	Absent	Absent	Absent	Absent	24hours	1
58	1741672	Absent	Absent	2	0	1	0	Absent	Absent	Absent	Absent	Absent	24hours	1
59	985792	Absent	Absent	4	1	1	1	Absent	Present	Absent	Absent	Absent	48hours	2
60	1744023	Absent	Absent	0	0	0	0	Absent	Absent	Absent	Absent	Absent	12hours	1
61	891799	Absent	Absent	2	1	0	1	Absent	Absent	Absent	Absent	Absent	48hours	2
62	1739780	Absent	Absent	4	2	1	1	Absent	Absent	Absent	Absent	Absent	48hours	2

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The Principal
Dayanand Medical College & Hospital
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Subject:: Approval of Plan of Thesis.

This is to inform you that the Faculty of Medical Sciences in its meeting held on 25.09.2023 has approved the plan of thesis of **Upkar**, a student of your college for **MS General Surgery** along with the names of Supervisor/Co-Supervisor as under:-

Topic Plan of Thesis
Comparative study of patients with long vs short hospital stay after elective laparoscopic cholecystectomy .

Supervisor
Dr. Varun Gupta
Assoc. Prof.,
Dept. of General Surgery

Co-Supervisor:-
Dr. Sanjeev K. Singla
Professor
Dept. of General Surgery

The student may submit the thesis in triplicate alongwith the plan in triplicate also, to the Controller of Examinations, BFUHS, Faridkot, at least six months before the commencement of theory examination, if he/she is otherwise eligible to take the examination. He /She may be directed to attach a photocopy of this letter with the forwarding letter while submitting thesis in the University along with the letter of approval of University for change of supervisor/Co-Supervisor, change of topic, if any.

Controller of Examinations

Note :

1. *If any discrepancy found regarding topic of thesis or Supervisor/Co-Supervisor, inform undersigned within one month after issue of this letter.*

COMPARATIVE STUDY OF PATIENTS WITH LONG VS. SHORT HOSPITAL STAY AFTER ELECTIVE LAPAROSCOPIC CHOLECYSTECTOMY

THESIS PROPOSAL

FOR APPROVAL OF SUBJECT OF THESIS TO BE SUBMITTED

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS

FOR THE DEGREE OF

MASTER OF SURGERY

IN

GENERAL SURGERY

OF THE

BABA FARID UNIVERSITY OF HEALTH SCIENCES

FARIDKOT

SEPTEMBER, 2022

DR. UPKAR

DEPARTMENT OF GENERAL SURGERY

DAYANAND MEDICAL COLLEGE & HOSPITAL,

LUDHIANA.

ABSTRACT OF PLAN OF THESIS

Title	COMPARATIVE STUDY OF PATIENTS WITH LONG VS. SHORT HOSPITAL STAY AFTER ELECTIVE LAPAROSCOPIC CHOLECYSTECTOMY
For the degree of	Master of Surgery
Name of the candidate	Dr. Upkar
Supervisor	Dr. Varun Gupta Associate Professor, Department of General Surgery, DMCH Ludhiana
Co-Supervisor	Dr. Sanjeev K. Singla Professor, Department of General Surgery DMCH Ludhiana
Institution	Dayanand Medical College and Hospital, Ludhiana
University	Baba Farid University of Health Sciences, Faridkot

Introduction: Laparoscopic Cholecystectomy is notably the most common minimal invasive surgery preferred for gallbladder related diseases across the globe. Considering this worldwide acknowledgement with increasing number of people undergoing laparoscopic cholecystectomy every year, studying the utilization of hospital resources becomes a topic of cardinal importance for better patient care. Although, there have been multiple studies concerning the entities involved, the results depicting the need for post operative hospital stays have been always up for debate. The variation in results suggest that there is a necessity for better understanding of the relationship between post op length of hospital stay and laparoscopic cholecystectomy. The focus of this thesis is to bring out the components which somehow influence the postoperative length of stay following Laparoscopic Cholecystectomy.

Aim of Study: To evaluate the contributing factors and their relative influence on postoperative length of stay.

Materials & methods: The study will be conducted among the patients admitted to department of general surgery for the period of 1.5 year in Dayanand Medical College and hospital, Ludhiana from November 2022 to May 2024.

Clinical Significance: The factors affecting Length Of Stay in all patients who have undergone cholecystectomy are still poorly understood as a result. To enhance perioperative patient care and save hospital expenses, we are therefore interested in investigating the variables that affected the length of stay (LOS) for all cholecystectomy patients at a hospital.

Keywords: Prospective Study, Observational, Laparoscopic Cholecystectomy, outcomes, Hospital Stay.

(Signature) Candidate	(Signature) Co-supervisor	(Signature) Supervisor	(Signature) Principal

CERTIFICATE OF FACILITIES AVAILABLE

This is to certify that the facilities for work on the subject of thesis titled **"COMPARATIVE STUDY OF PATIENTS WITH LONG VS. SHORT HOSPITAL STAY AFTER ELECTIVE LAPAROSCOPIC CHOLECYSTECTOMY"** exist in the Department of General Surgery at Dayanand Medical College and Hospital, Ludhiana and will be provided to the candidate. We will see that the data being included in the thesis are genuine and is collected by the candidate himself under our supervision and guidance.

Supervisor

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Co-Supervisors

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Date : _____

APPROVAL PROFORMA BY
RESEARCH & ETHICAL COMMITTEE
DAYANAND MEDICAL COLLEGE & HOSPITAL, LUDHIANA

Name of candidate	Dr. Upkar
Department	General Surgery
Topic of Thesis	COMPARATIVE STUDY OF PATIENTS WITH LONG VS. SHORT HOSPITAL STAY AFTER ELECTIVE LAPAROSCOPIC CHOLECYSTECTOMY
Likely date of appearing in PG examination	May/ June 2024
Date of enrollment	5th March 2022
Name of Head of Department	Dr. Jaspal Singh
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Signature of Members of Research Committee with Stamp	**Signature of Members of Ethics Committee with Stamp**
Dr. Harpreet Kaur (Professor & Head, Pathology)	Mr. R K Sharma (Legal Expert)
Dr. Jaspal Singh (Professor & Head, Surgery)	Dr. Ramit Mahajan (Associate Professor, Gastroenterology)
Dr. Dinesh Gupta (Professor & Head, Medicine)	Dr. Anu Sharma (Professor, Anatomy)
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Research Committee

Chairperson
Research Committee

Approved: Yes / No

Prof. Arvind Malhotra
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BABA FARID UNIVERSITY OF HEALTH SCIENCES, FARIDKOT

PROFORMA FOR REGISTRATION OF SUBJECT FOR DISSERTATION

1	NAME OF THE CANDIDATE AND ADDRESS	DR. UPKAR H. NO. 123, MOH. KAMALPUR, GOVT. COLLEGE ROAD, HOSHIARPUR
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3	COURSE OF STUDY AND SUBJECT	MS, GENERAL SURGERY
4	DATE OF ADMISSION OF COURSE	5th MARCH, 2022
5	TITLE OF THE TOPIC	COMPARATIVE STUDY OF PATIENTS WITH LONG VS. SHORT HOSPITAL STAY AFTER ELECTIVE LAPAROSCOPIC CHOLECYSTECTOMY

6. BRIEF RESUME OF THE INTENDED WORK

6.1 NEED FOR THE STUDY

Laparoscopic cholecystectomy for gallbladder disease is a common surgical procedure performed in hospitals throughout the world. The majority of studies that have addressed LOS in biliary disease to date have concentrated on a particular aetiology (most frequently acute cholecystitis), rather than the full spectrum of biliary disease. The factors affecting LOS in all patients who have undergone cholecystectomy are still poorly understood as a result. To enhance perioperative patient care and save hospital expenses, we are therefore interested in investigating the variables that affected the length of stay (LOS) for all cholecystectomy patients at a community hospital.

Gallstone disease (i.e., cholelithiasis) is a major health problem frequently addressed by general surgeons. The spectrum of acute biliary diseases is very much related to gallstones; acute cholecystitis, biliary colic gallstone pancreatitis and acute cholangitis are examples of common symptomatic gallstone diseases.[1] This condition affects approximately 10-15% of adults in the Western world population during their lives.[2-3] It has been observed that Intermediate prevalence rates occur in Asian populations (5-20%) and Black Americans (13.9% of women and 13.9% of men). The lowest frequencies are in Black Africans (<5%), the best studied being the Masi tribe and the Bantu, in whom the entity is virtually non-existent.[4-6] Prevalence of cholelithiasis in India is more common in Northern Indians than Southern Indians followed by Maharashtra particularly form coastal region.

Surgery is the gold standard for treating gall bladder pathologies. Laparoscopic cholecystectomy is a minimally invasive surgical procedure for removal of a diseased gallbladder. This technique essentially has replaced the open technique for routine cholecystectomies since the early 1990s.[7] At this time, laparoscopic cholecystectomy is indicated for the treatment of cholecystitis

(acute/chronic), symptomatic cholelithiasis, biliary dyskinesia, acalculous cholecystitis, gallstone pancreatitis, and gallbladder masses/polyps.[8] These indications are the same for an open cholecystectomy. Patients with bleeding diathesis and carcinoma gallbladder are the only major contraindications of treating gall stone disease with laparoscopic procedure.[9]

In 1990, 10% of cholecystectomies were performed laparoscopically in the U.S and by 1992, this percentage had risen to 90%. Never before had a surgical revolution occurred so quickly.[10] Population-based studies have found that the rate of cholecystectomy has increased since the introduction of the laparoscopic approach.[11-12] Given this ubiquity, hospital utilization for laparoscopic cholecystectomy is an important area for study to better manage the care for patients requiring intervention for symptomatic gallbladder disease.

Since its introduction, the length of stay (LOS) associated with LC has steadily reduced and it is now widely accepted as an appropriate and safe ambulatory procedure in carefully selected patients. Implementation of standard clinical pathways for LC have been reported to successfully reduce LOS and increase day case success. Day case laparoscopic cholecystectomy (DCLC) is associated with cost-savings without increasing the risk of adverse events or readmissions. It has a high rate of patient satisfaction and is comparable with inpatient stay with respect to quality of life, return to work and normal activity. Additionally, in the current climate every effort should be made to reduce the LOS associated with elective surgery in order to minimize potential exposure to COVID-19.

Various authors have predicted various factors for delayed postoperative stay. These included age over 60 years, time for diet resumption greater than 8 hours, and oral analgesia intake of greater than two tablets. Others have reported that the American Society of Anesthesiologists (ASA) score and intraoperative complications are the most predictive factors on length of hospital stay. It is also said that Operative findings of acute inflammation or postoperative

complications did not have any influence on the length of hospital stay. Also it has been reported that patients who get early LC have less hospital stay than patients who delay it. While an outpatient procedure is popular for LC, defining the indications and predictive factors associated with a delay in postoperative hospital stay is essential for maximizing the benefits of LC. However, there are few published articles on factors influencing the postoperative hospital stay after LC.[13-17]

The differing results for hospital length of stay suggest that there is a need for better understanding of the relationship between hospital length of stay and cholecystectomy. Thus the present study is conducted to evaluate the contributing factors and their relative influence on postoperative length of stay.

6.2 REVIEW OF LITERATURE

In order to determine the reasons for prolonged hospital stays following elective LC and to establish guidelines for ambulatory LC, Tang et al. conducted a retrospective analysis in 2007. Two groups were created out of them: While the SS group only required a brief hospital stay, the LS group required a lengthy stay (>24 hours following surgery). Of the 278 patients, they discovered that 118 (44.2%) were able to leave the hospital after 24 hours, whereas 149 (55.8%) required extended hospitalisation. In the univariate study, nine significant factors were detected; in the multivariate analysis, three independent components were discovered to predict a lengthy hospital stay. Patients older than 60 years were twice as likely to require lengthy hospital stays. Long hospital stays were four times more likely for patients who could not tolerate diet within eight hours or who took more than two oral analgesics (dologesics) tablets.

The main causes of longer or shorter postoperative length of stay for patients having laparoscopic cholecystectomy were assessed by Ivatury et al in 2011. The analysis included 232 patients in total. They discovered three preoperative patient characteristics were important contributors: white blood cell count and the occurrence of biliary pancreatitis were associated with higher postoperative length of stay, but body mass index was associated with lower postoperative length of stay. The postoperative duration of stay was significantly impacted by the amount of fluids supplied and the ASA class, with a higher ASA class having a greater impact. Increased surgical length of stay was significantly influenced by the utilisation component of nonelective status. They came to the conclusion that a number of factors significantly influenced the postoperative length of stay, with the ASA class and nonelective status having the largest enhanced contributions. Reduced hospital use may be a benefit of efforts to give elective therapy for individuals with symptomatic gallbladder disease that is as efficient as possible.[18]

In 2014, Choi et al. examined the variables that can lower the number of LC hospital days. The data analysis covered 89 patients in total. The postoperative day 0 group and the postoperative day 1 group of patients who were discharged underwent a comparative analysis. The findings revealed no discernible differences in clinical traits between patients who were released on postoperative day 0 and those who were released on postoperative day 1. Between the two groups, there were no discernible differences in the total number of disorders. On the seventh day following the procedure, post-operative problems in both groups were examined. There was no discernible difference between the two groups. Patients who were released from the patient group on postoperative day 0 were asked to complete surveys on their satisfaction with patient education, postoperative discomfort, and whether they thought it was a good idea to be released. The typical result was 8.3 out of 10. The group that was released from the hospital on postoperative day 0 had reduced overall costs when comparing the two groups' total hospital costs. They came to the conclusion that in patients with stable cardiovascular disease, simple pulmonary illness, and controlled diabetes mellitus, day-case laparoscopic cholecystectomy is equally safe and effective as standard clinical pathway used laparoscopic cholecystectomy.

To determine and assess risk factors for lengthy postoperative hospital stays (PHSs) in patients receiving emergency LC for Acute Cholecystitis (AC) in accordance with the 2013 Tokyo Guidelines, Inukai et al. conducted a prospective study in 2019. (TG13). Based on clinical development and PHS following LC, patients were categorised into early discharge (ED, discharge in three days or less postoperatively) and late discharge (LD, discharge in more than three days postoperatively) groups. As potential risk factors for LD, preoperative features and surgical outcomes were examined. They discovered that out of 149 patients, 104 (69.8%) were released from the hospital within 3 days after surgery, while 45 (30.2%) had lengthy

PHSs. Inflammation and fever were the primary causes of LD. Age, white blood cell count, C-reactive protein, total bilirubin (T-bil), alkaline phosphatase (ALP), anticoagulant medication, and TG13 severity grade were all significantly different in a univariate analysis of preoperative risk factors. Age >65 years, TG13 severity grade II, high T-bil and ALP levels, and age were all independent risk variables for protracted PHS, according to multivariate analysis. Longer PHSs in AC patients undergoing emergency LC may be predicted by older age, lower biliary function, and worse TG13 severity grade.[19]

In 370 patients who underwent LC for gallbladder illness, Morimoto et al. conducted a study in 2015 to look at the preoperative and intraoperative clinical parameters that are related to prolongation of hospital stay. According to the postoperative length of stay (LOS), patients were split into two groups: the regular duration group (LOS 5 days) and the extended duration (LD) group (LOS 6 days). The LD group contained 134 patients, while the normal duration group had 236. They discovered that the LOS in the groups with normal duration was 4.82 days and the LD group's was 12.08 days. 18.7% of patients in the LD group stayed longer than 14 days, however no patients were readmitted. Statistics showed differences in 13 clinical variables between the two groups. The two risk factors that were most likely to predict LOS extension were ASA score and LC difficulty. Eight variables were chosen from a pool of 13 elements to make up the LOS prediction score, which helped forecast whether a patient will have a lengthy hospital stay (sensitivity, 82.1 percent ; specificity, 75.0 percent). They came to the conclusion that 13 variables that were strongly associated to hospital stay length and LOS prediction score could forecast how long a patient would need to stay in the hospital.

In 2016, Chong et colleagues studied parameters affecting postoperative hospital stay following laparoscopic cholecystectomy. 336 patients receiving laparoscopic cholecystectomy for gallbladder

pathology at 8 hospitals were separated into 2 groups: 2 days or less and more than 2 days. Surgical and patient parameters were retrospectively examined. They found that the median patient age was 52, with 32 emergency and 304 elective surgeries. A univariate study of perioperative covariates found significant differences in operation time, transfusion, emergency surgery , acute inflammation, and surgical site infection. A univariate examination of patient characteristics found significant differences in age, gender, diabetes mellitus, preoperative albumin level, smoking, and ASA score . Multivariate analysis identified surgery time, emergency operation, age and smoking as factors affecting postoperative hospital stay.[20]

Gill et al in 2016 conducted a retrospective study to identify predictive risk factors for prolonged stay, defined as greater than 24 hours, and compare these factors to those for risk of conversion. Data for 207 patients was collected; 27 patients had a prolonged stay (13%), 15 of whom had operations converted to open surgery. A number of variables were significantly associated with prolonged stay and conversion; age , male gender, previous ERCP, ASA grade , previous abdominal surgery and abnormal liver function. Other factors that were significant for prolonged admission, but not conversion to open surgery, were renal co-morbidities , diagnosis other than gallstones and surgical factors including duration of surgery and complications following the procedure.[21]

In order to determine the reasons for a prolonged hospital stay following LC, Koi-iam et al. conducted a retrospective analysis in 2017. Long hospital stay was defined as the necessity for a stay of more than 24 hours following the procedure, whereas short hospital stay was defined as being discharged within 24 hours of the operation. They discovered that eleven distinct predicted markers for a prolonged hospital stay were revealed using multivariable analysis. These included patients with cirrhosis, those on warfarin anticoagulation, those with standard-pressure pneumoperitoneum, those who had

received metoclopramide as an intraoperative antiemetic drug, those who had been using abdominal drains, those with a numeric rating scale for pain greater than 3, those who needed more than two doses of oral analgesia, those with complications, and those with pri. They came to the conclusion that LC difficulties, together with pharmaceutical and surgical factors, were significant predictor factors for a lengthy hospital stay.[22]

1. AIMS AND OBJECTIVES OF THE STUDY

- To evaluate the contributing factors and their relative influence on postoperative length of stay.

7.0 MATERIALS AND METHODS

7.1 SOURCE OF DATA

The prospective observational study will be conducted in the Department of General Surgery at Dayanand Medical College and Hospital, Ludhiana, Punjab, India. 80 patients will be enrolled in the study. Patients presenting in Department of Surgery through OPD with symptomatic gall stone disease will be enrolled in the study.

7.2 METHOD OF COLLECTION OF DATA

They were divided into two groups: Longer Stay (LS) group with long hospital stay and SS group with short hospital stay. Long hospital stay was defined as stay of more than 24 hours after operation. Variables were documented from medical records for comparison between the two groups. A total of 15 variables were identified for comparison. These included six patient variables (age, American Society of Anesthesiologists [ASA] risk classification, sex, previous upper intra-abdominal surgery, indication of surgery, duration of symptoms), eight operative variables (operative time, contracted gall bladder, type of procedure, operative findings of acute inflammation, thickened gallbladder wall, presence of adhesion, incidental perforation of gallbladder, use of abdominal drain) and four postoperative variables (time for diet resumption, postoperative nausea or vomiting [PONV], oral analgesia requirement, complications).

A general bio-data of the patients regarding their name, age, sex, occupation, religion, socioeconomic status and address were collected. Detailed history was taken with special reference to the duration of right upper quadrant pain or epigastric pain, periodicity, any aggravation by fatty meals and any relief by parenteral or oral analgesics. Any significant past history was also taken into account. A routine general physical, abdominal and systemic examination was performed. Pre-operative work up included routine lab investigations like complete blood count, renal function test, liver function tests,

hepatitis profile, Chest-X-Ray and ultrasound of abdomen. Ultrasonogram of the abdomen was routinely done on all the patients to confirm the clinical diagnosis of cholelithiasis. The number and size of the calculus, as well as size of the gallbladder, its wall thickness, pericholecystic collection and CBD calculi or CBD dilatation. A routine pre-anaesthetic checkup was done for all patients. A fully explained well informed consent was taken from all patients undergoing surgery and with explanation of risk of conversion to open cholecystectomy. We also placed nasogastric tube in all patients for gastric decompression to prevent trocar injury. All cases received prophylactic pre-op antibiotics (Inj. Cefuroxime 1.5 gm IV).

The procedure was performed by different senior surgeons. Standard four port technique was performed in the operation, using carbon dioxide insufflation. The Veress technique was used to obtain pneumoperitoneum. During surgery the cystic artery and cystic duct were skeletonized and clamped separately with metallic clips. Some cases a suction drain was placed. All patients were started on oral liquids and then solid diet from 3rd day after surgery, provided the patient had no nausea and vomiting.

INCLUSION CRITERIA:

- Adult patients above the age of 18 years who are undergoing elective laparoscopic cholecystectomy.
- USG findings:-
  1. GB stone
  2. Thickened GB wall
  3. Edematous GB wall
  4. Peri-cholecystic fluid collection.

EXCLUSION CRITERIA:

- Age < 18 years
- Gall Bladder Malignancy

- Adults with choledocholithiasis
- Perforated Gallbladder
- Pregnancy
- Patients unfit for General anesthesia
- Previous upper abdominal surgery.
- CBD dilated >10mm.
- Previous CBD exploration.
- Pancreatitis
- Jaundice/ deranged LFT.
- Denial of Consent

SAMPLE SIZE CALCULATION

The Gallstone Surgery prevalence rate is 5% based on previous data (study).

Assumptions:
Confidence Level = 95%
Precision (d) = ± 5%
For estimation of sample size, the following formula has been used
$n = (Z^2\alpha \text{ X } P \text{ X } (1\text{-}P))/d^2$
Where;
Zα = Value of standard normal variate corresponding to α level of significance
P = Likely value of parameter
Q = 1 – P
d = Margin of errors which is a measure of precision
With these assumptions the sample size works out as 73. This number has been increased to 80 to allow for a predicted dropout from treatment.

OUTCOME: To know factors affecting post operative length of hospital stay after laparoscopic cholecystectomy.

Statistical analysis

Data will be described in terms of range; mean ±standard deviation (± SD), median, frequencies (number of cases) and relative frequencies (percentages) as appropriate. To determine whether the data is normally distributed, a Kolmogorov-Smirnov test will be used. Comparison of quantitative variables between the study groups will be done using Student t-test and Mann Whitney U test for independent samples for parametric and non-parametric data respectively. For comparing categorical data, Chi square ($\chi 2$) test will be performed and fisher exact test will be used when the expected frequency is less than 5. A probability value (p value) less than 0.05 will be considered statistically significant. All statistical calculations will be done using (Statistical Package for the Social Science) SPSS 21version (SPSS Inc., Chicago, IL, USA) statistical program for Microsoft Windows.

7.3 DOES THE STUDY REQUIRE ANY INVESTIGATIONS OR INTERVENTIONS TO BE CONDUCTED ON PATIENTS OR OTHER HUMANS OR ANIMALS? IF SO, PLEASE DESCRIBE BRIEFLY.

Yes, Pre-Operative investigations and surgery (Laparoscopic Cholecystectomy) has to be done in patients with symptomatic gall stone disease.

7.4 HAS ETHICAL CLEARANCE BEEN OBTAINED FROM YOUR INSTITUTION IN CASE OF 7.3?

Yes, Attached herewith.

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PROFORMA

Case No.

MRD No._____

Name_____ Age &Sex_____

Father's/Husband's Name_____

Address _____

_____

Telephone No._____

Date of Admission_____

Date of operation_____

Date of Discharge_____

Diagnosis_____

Chief complaints:

EXAMINATION FINDINGS:

Per Abdomen:

SIGNATURE OF CANDIDATE SIGNATURE OF SUPERVISOR

Investigations:

HB……..

T.L.C……..

PLT COUNT….

P.T.I……

INR…….

HIV-I.....

HIV-II.....

HBsAg.....

Anti-HCV.....

RFT'S

BloodUrea……mg%
S.Creatinine……..mg%

FBS…….....mg/dl

LFT'S

S.bilirubin(Total)……..mg/dl

S.bilirubin(Direct)……mg/dl

S.G.OT……...IU/L

S.G.P.T……...IU/L

A.L.P……..IU/L

U.S.G. FINDINGS:

- GB Distended or Contracted.
- CBD Status
- Liver Finding
- GB Wall Thickness

SIGNATURE OF CANDIDATE SIGNATURE OF SUPERVISOR

Any other investigation (as and when required)

Date of Surgery_____

Duration of surgery_____

Intraoperative findings:

- Empyema of gall bladder_____
- Gangrenous gall bladder_____
- Adhesions_____
- Gall bladder wall status_____
- Any other finding_____

Intraoperative Complications:

- GB rupture_____
- GB bed haemorrhage_____
- Cystic artery haemorrhage_____
- CBD injury_____
- Duodenal injury_____
- Injury to other organs_____
- Stone spillage_____
- Any other complication_____

SIGNATURE OF CANDIDATE SIGNATURE OF SUPERVISOR

Post-operative finding:

VAS Score at

3hr_____

6hr_____

12hr_____

24hr_____

Abominal Distension_____

Nausea/Vomiting_____

Icterus_____

Post-operative complication:

- Haemorrhage(intraperitoneal or from port site)_____
- Bile leak(from gallbladder bed or cystic duct stump)_____
- CBD Injury_____
- Paralytic Ileus_____
- Wound related complications_____
- Shoulder Pain_____
- Urinary Retention_____

POST OPERATIVE HOSPITAL STAY :

SIGNATURE OF CANDIDATE SIGNATURE OF SUPERVISOR

INFORMED PATIENT CONSENT

Date: _____

I…….D/o, W/o, S/o……..…… am willing to participate in the study **"COMPARATIVE STUDY OF PATIENTS WITH LONG VS. SHORT HOSPITAL STAY AFTER ELECTIVE LAPAROSCOPIC CHOLECYSTECTOMY"** The procedure with its complications has been explained to me in local vernacular language. I have fully understood that no special tests and extra expenditure in any form, merely for the purpose of thesis is being carried out. I am free to opt out the study any time without assigning any reason.

……. ……
Signature of the Witness Signature of the patient

Name:

Signature of Candidate **Signature of Supervisor**

मरीज अनुमति फार्म

तिथि _____

मैं _____ पत्नी/पुत्र/पुत्री _____

निवासी _____

इस शोधकार्य **"COMPARATIVE STUDY OF PATIENTS WITH LONG VS. SHORT HOSPITAL STAY AFTER ELECTIVE LAPAROSCOPIC CHOLECYSTECTOMY"** में भाग लेने के लिए सहमत हूँ। मैं इस शोधकार्य में भाग लेने के लिए अपनी स्वेच्छा से तैयार हूँ। मैं पुष्टि करता/करती हूँ की यह स्वीकृति देने के लिए मुझे कोई आर्थिक प्रलोभन नहीं दिया गया और न ही दबाव डाला गया है। मुझे इस शोधकार्य का उद्देश्य स्पष्ट कर दिया गया है और मुझे यह विश्वास है की यह विज्ञान और मानवता के लाभ के लिए है। मुझे इस शोधकार्य में होने वाले जोखिम के बारे में समझा दिया गया है और मेरी समझ में यह जोखिम बहुत मामुली है।

मैं इस शोधकार्य में भाग लेने के सम्बन्ध में किसी भी समय अपनी अस्वीकृति व्यक्त कर सकता/सकती हूँ और मेरे अस्वीकृति व्यक्त करने का मेरे इलाज पर कोई प्रभाव नहीं पड़ेगा।

_____	_____
गवाह के हस्ताक्षर	रोगी के हस्ताक्षर/अंगूठे का निशान
नाम:	नाम:

_____

अन्वेषक के हस्ताक्षर

_____

विद्यार्थी के हस्ताक्षर

ਮਰੀਜ਼ ਰਜ਼ਾਮੰਦੀ ਫਾਰਮ

ਮਿਤੀ_____

ਮੈ_____ਪਤਨੀ/ਪੁੱਤਰ/ਪੁੱਤਰੀ_____

ਵਾਸੀ _____

“COMPARATIVE STUDY OF PATIENTS WITH LONG VS. SHORT HOSPITAL STAY AFTER ELECTIVE LAPAROSCOPIC CHOLECYSTECTOMY” ਤੇ ਚਲ ਰਹੀ ਖੋਜ ਵਿਚ ਹਿੱਸਾ ਲੈਣ ਲਈ ਰਜ਼ਾਮੰਦ ਹਾਂ। ਇਸ ਖੋਜ ਕੰਮ ਵਿਚ ਹਿੱਸਾ ਲੈਣ ਲਈ ਮੈ ਆਪਣੀ ਮਰਜ਼ੀ ਨਾਲ ਤਿਆਰ ਹਾਂ। ਮੈ ਇਹ ਦਸਣਾ ਚਾਹੁੰਦਾ ਹਾਂ/ ਚਾਹੁੰਦੀ ਹਾਂ ਕੇ ਇਹ ਰਜ਼ਾਮੰਦੀ ਦੇਣ ਵਾਸਤੇ ਮੈਨੂ ਕਿਸੇ ਵੀ ਤਰਾਂ ਦਾ ਲੋਭ-ਲਾਲਚ ਨਹੀ ਦਿੱਤਾ ਗਿਆ ਅਤੇ ਨਾ ਹੀ ਕੋਈ ਦਬਾ ਪਾਇਆ ਗਿਆ ਹੈ। ਮੈਨੂ ਇਸ ਖੋਜ ਦਾ ਮਨੋਰਥ ਸਮਝਾ ਦਿੱਤਾ ਗਿਆ ਹੈ ਅਤੇ ਮੈਨੂ ਇਹ ਭਰੋਸਾ ਦਵਾਇਆ ਗਿਆ ਹੈ ਕੇ ਇਹ ਖੋਜ ਵਿਗਿਆਨ ਅਤੇ ਮਾਨਵਤਾ ਦੀ ਭਲਾਈ ਲਈ ਹੈ। ਮੈਨੂ ਇਸ ਖੋਜ ਵਿਚ ਹੋਣ ਵਾਲੇ ਖਤਰੇ ਬਾਰੇ ਸਮਝਾ ਦਿੱਤਾ ਗਿਆ ਹੈ ਅਤੇ ਮੈਨੂ ਇਹ ਯਕੀਨ ਹੈ ਕੇ ਇਹ ਖਤਰਾ ਬਹੁਤ ਮਾਮੂਲੀ ਹੈ। ਮੈਨੂ ਇਸ ਖੋਜ ਕੰਮ ਵਿਚ ਹਿੱਸਾ ਲੈਣ ਦਾ ਢੰਗ – ਤਰੀਕਾ ਸਮਝਾ ਦਿੱਤਾ ਗਿਆ ਹੈ।

ਮੈ ਇਸ ਖੋਜ ਕੰਮ ਵਿਚ ਹਿੱਸਾ ਲੈਣ ਬਾਰੇ ਆਪਣੀ ਰਜ਼ਾਮੰਦੀ ਕਿਸੇ ਵੀ ਸਮੇ ਵਾਪਸ ਲੈ ਸਕਦਾ ਹਾਂ/ ਸਕਦੀ ਹਾਂ ਅਤੇ ਮੇਰੀ ਰਜ਼ਾਮੰਦੀ ਵਾਪਸ ਲੈਣ ਦਾ ਮੇਰੇ ਇਲਾਜ ਤੇ ਕੋਈ ਅਸਰ ਨਹੀ ਹੋਵੇਗਾ।

_____ _____

ਗਵਾਹ ਦੇ ਹਸਤਾਖਰ ਮਰੀਜ਼ ਦੇ ਹਸਤਾਖਰ

ਮਿਤੀ_____ ਮਿਤੀ_____

ਪਤਾ _____ ਪਤਾ _____

_____

ਨਿਰੀਖਕ ਦੇ ਹਸਤਾਖਰ

_____

ਸਿਖਿਆਰਥੀ ਦੇ ਹਸਤਾਖਰ